

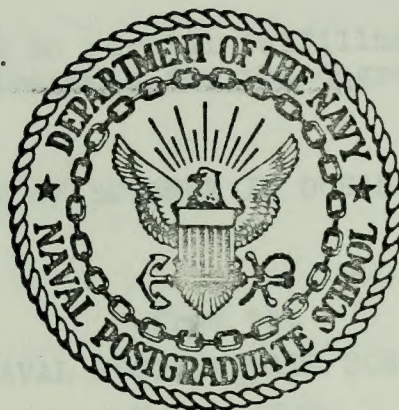
GEOSTROPHIC CIRCULATION OFF THE
COAST OF CENTRAL CALIFORNIA

Robert Lee Brown

DUDLEY KNOX LIBRARY
NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA 93940

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

GEOSTROPHIC CIRCULATION OFF THE
COAST OF CENTRAL CALIFORNIA

by

Robert Lee Brown

Thesis Advisor:

R.H. Bourke

March 1974

Approved for public release; distribution unlimited.

Geostrophic Circulation off the
Coast of Central California

by

Robert Lee Brown
Lieutenant Commander, United States Navy
B.S.I.M., Purdue University, 1965

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OCEANOGRAPHY

from the
NAVAL POSTGRADUATE SCHOOL
March 1974

Thesis
B 82243
c-1

Department of Chemistry
University of California

Robert Lee Brown
Lieutenant Commander, United States Navy
S.B.L.M., Eugene University, 1952

Presented in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN CHEMISTRY

1954
NAVAL POSTGRADUATE SCHOOL
1954-1955

ABSTRACT

The seasonal variations in temperature, salinity, water masses and geostrophic currents at the surface and 200 m are discussed for the region off the Central California coast near Monterey. The results were obtained from data collected on six cruises covering a span of two years from 1970 to 1972.

It is shown that the surface currents are subject to marked seasonal variability with the mean flow characterized by eddies and filaments. The currents at 200 m are similar to those found at the surface. The bottom topography influences the direction of flow inside the 1000 fathom curve.

Seasonal variations in temperature and salinity generally conformed to Skogsberg's (1936) annual cycle composed of three distinct hydrographic seasons.

Only subtle changes in water masses from season to season were noted. Greater than 60 per cent Equatorial Pacific water is found throughout the year below 800 m. The proportion of Equatorial Pacific water increases with depth and towards shore.

ABSTRACT

The seasonal variations in temperature, salinity, water masses and geostrophic currents at the surface and 200 m were observed for the region off the Central California coast near Monterey. The results were compared from data collected on six cruises covering a span of two years from 1970 to 1972.

It is shown that the surface currents are subject to marked seasonal variability with the mean flow characterized by northward flow in summer, the summer of 1971 a strong flow to the south of the surface. The bottom topography influenced the direction of flow below the 1000 fathom contour.

Seasonal variations in temperature and salinity generally correspond to Thompson's (1955) annual cycle composed of three distinct hydrographic seasons. Only subtle changes in water masses from season to season were noted. However, the 50 per cent Equatorial Pacific water is found throughout the year below 500 m. The presence of Equatorial Pacific water increases with depth and towards shore.

TABLE OF CONTENTS

I.	INTRODUCTION -----	8
II.	REVIEW OF THE LITERATURE -----	11
	A. GENERAL CURRENT PATTERN -----	11
	B. WATER MASSES -----	14
III.	THE DATA -----	18
	A. AREA OF INVESTIGATION AND COLLECTION OF DATA -----	18
IV.	ANALYSIS -----	27
	A. PRESENTATION OF DATA -----	27
	B. THE GEOSTROPHIC CURRENT -----	28
	C. LIMITATIONS OF THE DYNAMIC METHOD -----	31
V.	RESULTS -----	33
	A. REPRESENTATION OF CURRENTS -----	33
	B. SURFACE CURRENTS -----	34
	C. CURRENTS AT A DEPTH OF 200 METERS -----	44
	D. TEMPERATURE AND SALINITY AT THE SURFACE -----	44
	E. TEMPERATURE AND SALINITY AT 200 METERS -----	55
	F. VERTICAL DISTRIBUTION OF TEMPERATURE AND SALINITY -----	59
	G. MIXING OF WATER MASSES BETWEEN 100 AND 1000 METERS -----	67
VI.	SUMMARY AND CONCLUSIONS -----	80
	A. CURRENTS -----	80
	B. TEMPERATURE AND SALINITY -----	81
	C. MIXING OF WATER MASSES -----	81
APPENDIX A	-----	82

APPENDIX B -----	98
APPENDIX C -----	120
APPENDIX D -----	136
APPENDIX E -----	155
APPENDIX F -----	179
APPENDIX G -----	223
BIBLIOGRAPHY -----	260
INITIAL DISTRIBUTION LIST -----	262
FORM DD 1473 -----	264

FIGURES

1.	Mean surface currents in the North Pacific -----	12
2.	Temperature-salinity curves from selected stations -----	17
3.	T-S curves defining Subarctic North Pacific and Equatorial water -----	17
4.	Major geographical and topographical features of the study area -----	19
5.	Oceanographic stations occupied during Cruise I ---	20
6.	Oceanographic stations occupied during Cruise II --	21
7.	Oceanographic stations occupied during Cruise III -	22
8.	Oceanographic stations occupied during Cruise IV --	23
9.	Oceanographic stations occupied during Cruise V ---	24
10.	Oceanographic stations occupied during Cruise VI --	25
11.	Cruise I. Surface currents -----	35
12.	Cruise II. Surface currents -----	36
13.	Cruise III. Surface currents -----	37
14.	Cruise IV. Surface currents -----	38
15.	Cruise V. Surface currents -----	41
16.	Cruise VI. Surface currents -----	42
17.	Cruise I. Currents at 200 m. -----	45
18.	Cruise II. Currents at 200 m. -----	46
19.	Cruise III. Currents at 200 m. -----	47
20.	Cruise IV. Currents at 200 m. -----	48
21.	Cruise V. Currents at 200 m. -----	49
22.	Cruise VI. Currents at 200 m. -----	50
23.	Cruise III. Temperature and salinity at the sea surface -----	51

24.	Cruise V. Temperature and salinity at the sea surface -----	52
25.	Cruise VI. Temperature and salinity at the sea surface -----	53
26.	Cruise III. Temperature and salinity at 200 m. --	56
27.	Cruise V. Temperature and salinity at 200 m. ----	57
28.	Cruise VI. Temperature and salinity at 200 m. ---	58
29.	Cruise III. Vertical cross section of temperature -----	60
30.	Cruise III. Vertical cross section of salinity -----	61
31.	Cruise V. Vertical cross section of temperature -	62
32.	Cruise V. Vertical cross section of salinity ----	63
33.	Cruise VI. Vertical cross section of temperature -----	64
34.	Cruise VI. Vertical cross section of salinity ---	65
35.	T-S curves defining Subarctic and Equatorial Pacific water -----	68
36.	Cruise III. T-S curves for Stations Q and R -----	70
37.	Cruise V. T-S curves for Stations I-8 and I-10 --	71
38.	Cruise VI. T-S curves for Stations 4 and 6 -----	72
39.	Cruise III. Vertical cross section showing percentage of Equatorial water -----	73
40.	Cruise V. Vertical cross section showing percentage of Equatorial water -----	74
41.	Cruise VI. Vertical cross section showing percentage of Equatorial water -----	75
42.	Section 3 off Monterey, showing percentage of Equatorial water -----	76
43.	Cruise VI. Vertical cross section showing percentage of Equatorial water (northern section)-	78
44.	Cruise VI. Vertical cross section showing percentage of Equatorial water (southern section)-	79

ACKNOWLEDGEMENT

This thesis involves many to whom I owe much and can extend only token thanks. My special thanks go to Professors Robert H. Bourke and Jacob B. Wickham for their encouragement in this project and their assistance in improving its content. Last, but certainly not least, I wish to thank my wife, Elizabeth, whose encouragement and patience have allowed me to undertake and complete this task.

I. INTRODUCTION

Kin'dyushev (1970) stated that the California region is one of the most intensely studied regions of the Pacific Ocean. This statement may be factual, but only with certain reservations. A review of the available literature reveals that the region from the Gulf of Alaska south to Cape Mendocino (41°N) has held the interest of researchers for many years. This may be explained by: (1) the uniqueness and complexity of the oceanic processes that occur in this region; (2) the high concentration of commercial fisheries and other important commercial enterprises; and (3) the fact that several oceanographic institutions such as Oregon State University and the University of Washington are physically located adjacent to the area. The region from Point Conception (34°N) south to Cabo San Lucas on the southern tip of Baja California has received a great deal of attention by Scripps Institute of Oceanography and various less well known institutions for the same reasons cited above. These constitute the areas of intense research along the west coast of the United States. Thus there is a region along the Central California coast between Cape Mendocino and Point Conception that has received relatively little attention in the literature.

The purpose of the research reported in this study is to help close the "gap" noted above and to document an

analysis of the geostrophic circulation patterns off the Central California coast near Monterey. The hydrography of the area is examined and an attempt is made to determine the distribution of the various water masses that are present in this region. An additional objective was to examine the validity of the seasonal concept for this region first postulated by Skogsberg (1936), wherein the annual cycle is divided into three distinct hydrographic seasons: the Davidson Current, Upwelling, and Oceanic Seasons.

The region off the Central California coast is characterized by complex flow patterns that are subject to diurnal, semidiurnal and seasonal variations (Reid and Swartzlose, 1963). The offshore California Current, the inshore Davidson Current, seasonal upwelling and the bottom topography are just some of the factors which play an important role in the formation of the currents in this region. In addition, the area lies in a zone in which both subarctic and subtropical water masses are present. This is known as the "transition zone," a term first introduced by Sverdrup, Johnson, and Fleming (1942). As noted by Kin'dyushev (1970), consideration of current patterns in an area is essential for an understanding of the origins and interactions of the various waters observed in that region.

Flow in the surface layers of the deep ocean is influenced by several forces: the most important are the horizontal pressure gradient and viscous forces within the fluid, the

action of wind stress, tidal forces, and the Coriolis force. At present our incomplete knowledge of ocean dynamics and the lack of suitable available data, such as direct current measurements, restrict this study to the indirect determination of surface currents. Accordingly the "dynamic method" for computing the geostrophic current is utilized.

II. REVIEW OF THE LITERATURE

A. GENERAL CURRENT PATTERN

The currents of the eastern north Pacific Ocean are part of the large anticyclonic gyre centered near the Hawaiian Islands. The eastern portion of this gyre -- the California Current -- represents the continuation of the Aleutian Current of the North Pacific (Sverdrup, Johnson and Fleming, 1942). As can be seen in Figure 1 it develops as an independent current in the region of divergence of the North Pacific Current (approximately 48°N) at the North American coast. It flows southeast along the continent at 0.2-0.6 knots in a band approximately 400 miles wide (Kin'dyushev, 1970). Due to the large expanse of the current, no high velocities are encountered except within local eddies (Sverdrup, et al., 1942). In the vicinity of latitude 32°N the California Current turns toward the coast and then to the north in a sharp meander before turning south again. Pavlova (1966) reported that this stable rotation is probably due to features of bottom topography in the area and to the pattern of prevailing winds along the coast. Pavlova's results were based on analysis of geostrophic currents. Since then the rotation of the water at 32°N was confirmed with parachute drogues by Reid, Swartzlose and Brown (1963). Pavlova also noted that rotations could be traced on charts of geostrophic circulation.

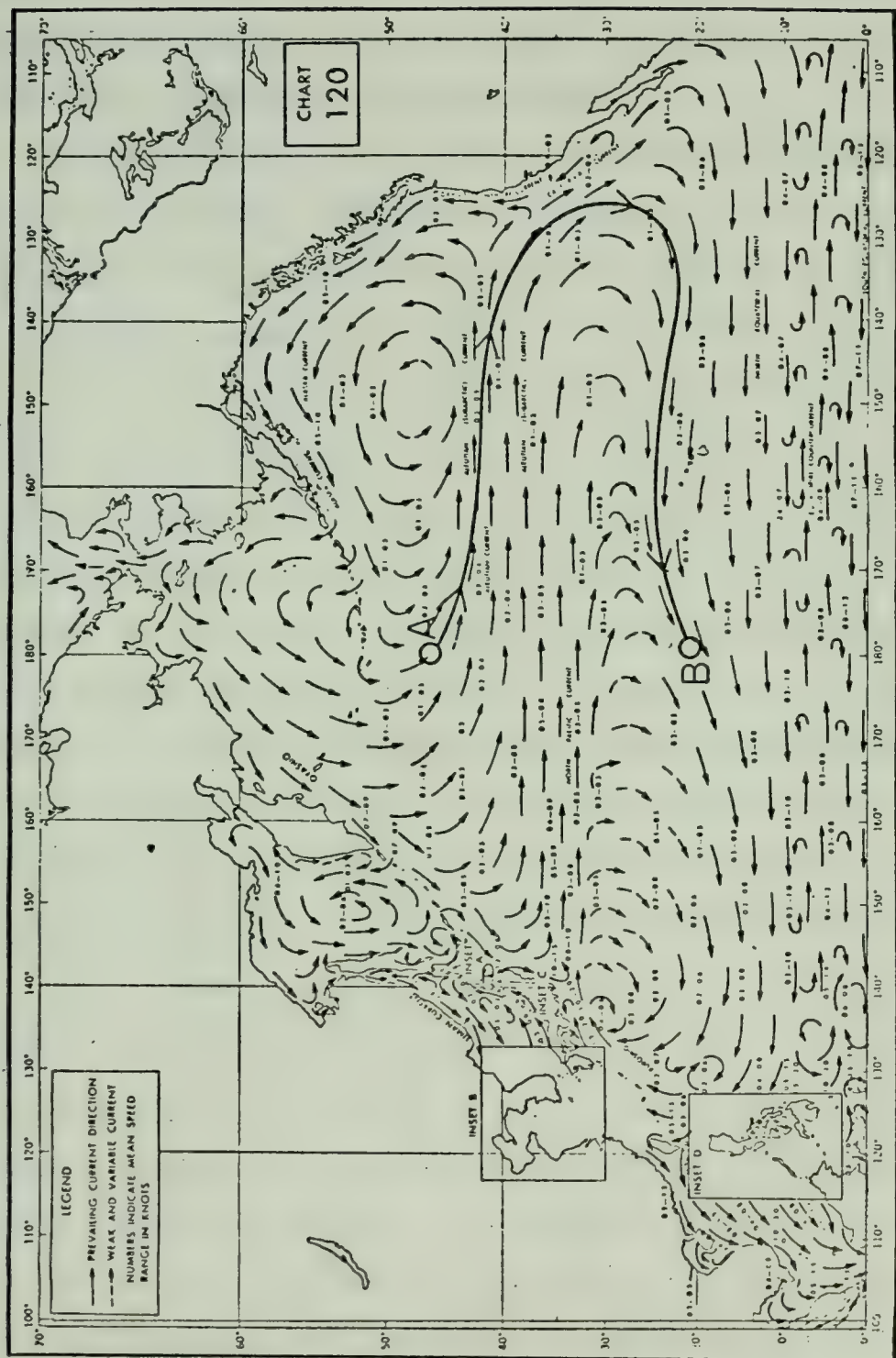


Fig. 1. Mean surface currents in the North Pacific (from Namias, 1970). Solid curve indicates trajectory of water from A to B around Pacific gyre.

Generally speaking, south of 32°N the California Current represents a wide body of water which moves sluggishly toward the southeast and eventually turns westward at about 24°N (Reid, Roden, and Wyllie, 1958).

Characteristic of the California Current are significant seasonal variations (depending on changes in the wind field) associated with the seasonal displacements of the center of the Hawaiian anticyclone (Reid, et al., 1958). During the fall and winter months, when the prevailing northerly winds weaken, a countercurrent, referred to by many authors as the California Countercurrent, or more commonly as the Davidson Current, develops in the surface layer between the California Current and the coast. At this time the Davidson Current is most intense and takes the form of a narrow band within this region. In spring and early summer north-northwest winds intensify and prevail over the entire coastal region (Sverdrup, et al., 1942). During these months the prevailing winds give rise to intense upwelling and the Davidson Current gradually breaks up into separate cyclonic and anticyclonic eddies (Kin'dyushev, 1970; Sverdrup, et al., 1942). Pavlova (1966) reported that north of Point Conception, the Davidson Current reaches its maximum development at depth (200-250 m) in the summer and autumn. It reaches its maximum development at the surface from October through April, i.e., late autumn to early spring. Furthermore, in August the Davidson Current is scarcely noticeable at the surface despite active development at depth. In December the core of maximum velocity

emerges at the surface and in the late spring it almost completely disappears (Reid, 1960; Reid, et al., 1958, Pavlova, 1966).

Based on data collected within the confines of Monterey Bay, Skogsberg (1936) divided the year into three periods: the Davidson Current season, lasting from the middle of November to the middle of February; the upwelling season, between the middle of February and the end of July; and the oceanic season, from the end of July to the middle of November. He characterized the Davidson Current season as one in which there is a relatively thick upper homogeneous layer where the temperature at 50 m is only slightly lower than at the surface. During the upwelling period the California Current reaches the coast and, under the influence of the prevailing northwesterly winds, upward vertical motion takes place near the coast bringing relatively cold subsurface water toward the surface. As a result, the temperatures at given depths decrease when upwelling begins. As the upwelling gradually ceases toward the end of August, a sharp rise in temperature takes place both at the surface and at subsurface depths due to effects of heating and conduction and intrusion of offshore water.

B. WATER MASSES

A number of special studies of the water masses of the California region of the Pacific Ocean have been reported by Tibby (1941), Sverdrup and Fleming (1941), Sverdrup,

et al., (1942). Reid, Roden and Wyllie (1958) described the hydrography of the entire Northeast Pacific Ocean and reported that water entering the California Current system comes from four great water masses.* The offshore waters of the northern part of the California Current are derived from the Subarctic Water Mass. As this water moves to the south (east of 147°W), it mixes with waters from the Central Water Mass which move in from the northwest and west. A major influx of southern water from the Equatorial Water Mass enters the system as a subsurface current from the south. This current is the previously discussed Davidson Current which tends to be near the coast. The fourth major water source is derived from the upwelling processes at the coast.

Sverdrup and Fleming (1941), Tibby (1941), and Sverdrup, et al, (1942), simplified the classification problem by defining two extreme water masses: a "northern" and a "southern." These two water masses were named according to the regions from whence they originated and were called "Subarctic North Pacific" and "Equatorial Pacific," respectively.

A characteristic of Equatorial Pacific water, as defined by Sverdrup and Fleming (1941), was a Temperature-Salinity (T-S) curve on which salinity was relatively constant as

* The term, water mass, is used in the manner defined by Sverdrup, Johnson, and Fleming, 1942: 143-146.

temperature decreased (see Figure 2, curves S.3 and B-III, 31). A T-S curve for Subarctic water shows an increase in salinity with decreasing temperature (Figure 2, curve C 131). They, as well as Tibby (1941), constructed a chart defining percentage Equatorial water for given T-S pairs (Figure 3). Based on this definition they traced the northward intrusion of Equatorial water. As might be expected, the percentage of Equatorial water decreased in the direction of flow in the northward flowing current.

The region of study off Monterey lies nearly in the center of the transition zone between the subarctic and the subtropical water masses. Roden (1971) placed the northern boundary of the transition zone near 42°N , and the southern boundary at approximately 30°N . However, he, as well as most other investigators, concentrated on determining the boundaries of the transition zone rather than on conditions within the zone.

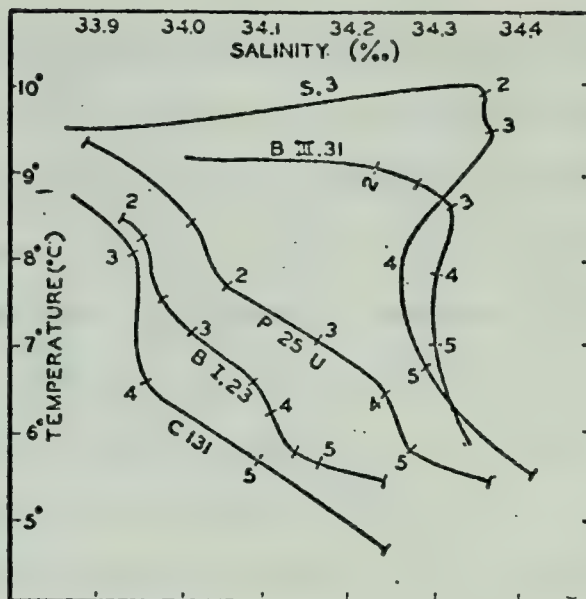


Figure 2. Temperature-salinity curves from selected stations (from Sverdrup and Johnson, 1941).

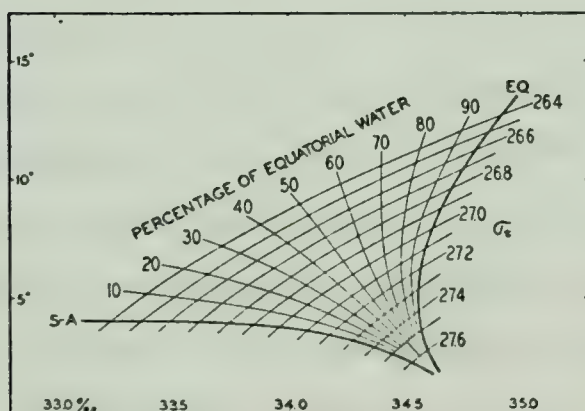


Figure 3. Graph showing T-S curves defining Subarctic North Pacific and Equatorial water, and curves for various percentages of Equatorial water assuming mixing along surfaces of equal σ_t . (from Tibby, 1941).

III. THE DATA

A. AREA OF INVESTIGATION AND COLLECTION OF DATA

The area of investigation is shown in Figure 4, in which the outstanding features of the topography of the bottom have been indicated. The major topographical features of the area include the Monterey Canyon and Monterey Bay. The area of investigation is bounded on the north by latitude 37°N , on the west at approximately 124°W , and on the south by latitude $35^{\circ}30'\text{N}$.

The data were obtained from six U.S. Naval Postgraduate School oceanography student training cruises. The station plans for the various cruises are shown in Figures 5-10. It should also be noted that the cruises were conducted during varying months, over a period of two years, thus making available data for the study of seasonal variability of properties and conditions.

Water samples were obtained by means of standard Nansen reversing water bottles, and temperatures by means of reversing thermometers. On each cast both unprotected and protected thermometers were attached to two or three Nansen bottles in order to accurately determine the depths of observation. All other bottles were provided with two protected thermometers.

The temperatures have been corrected in the ordinary manner. The salinities were determined on board the

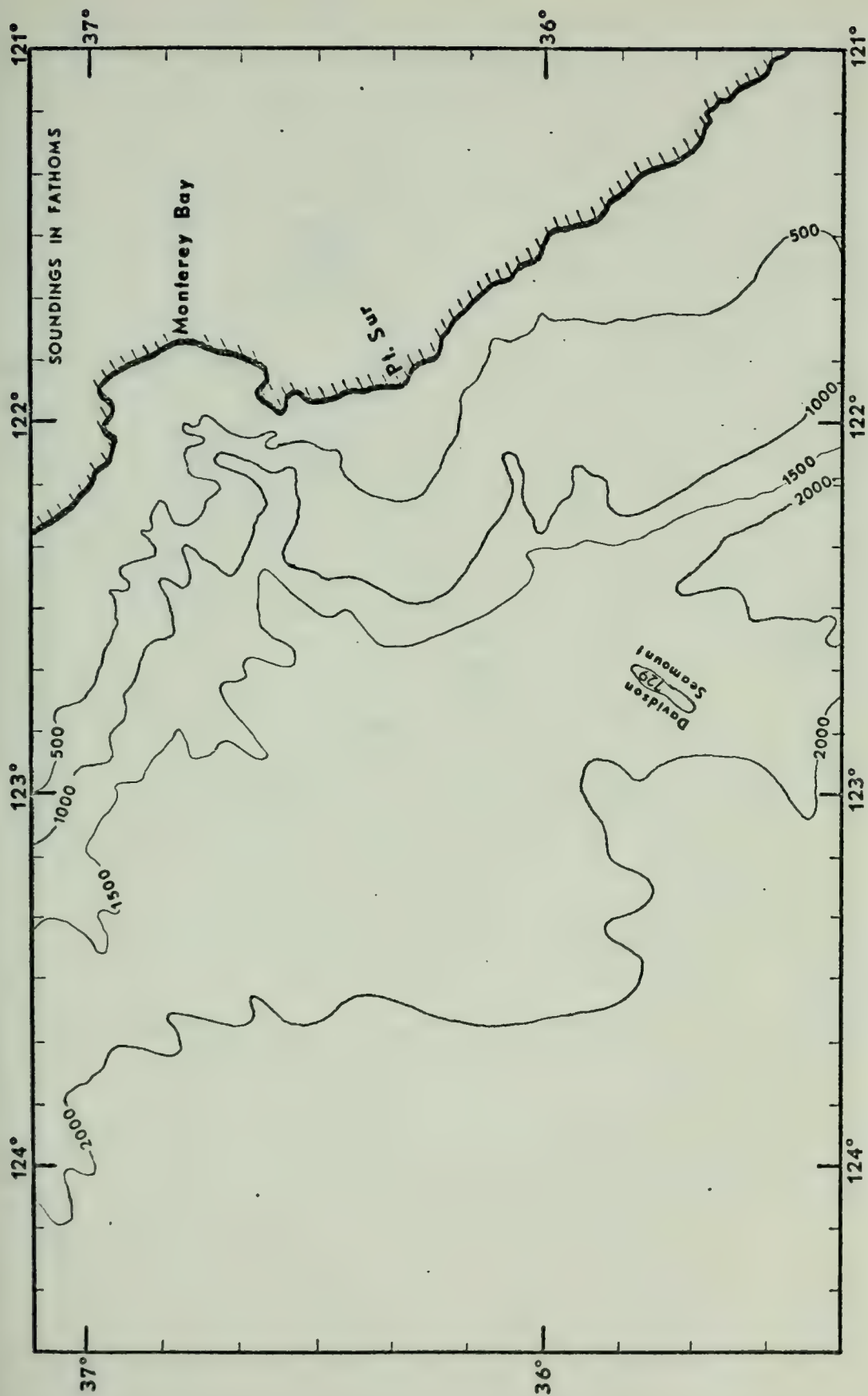


Fig. 4. Major geographical and topographical features of the study area.

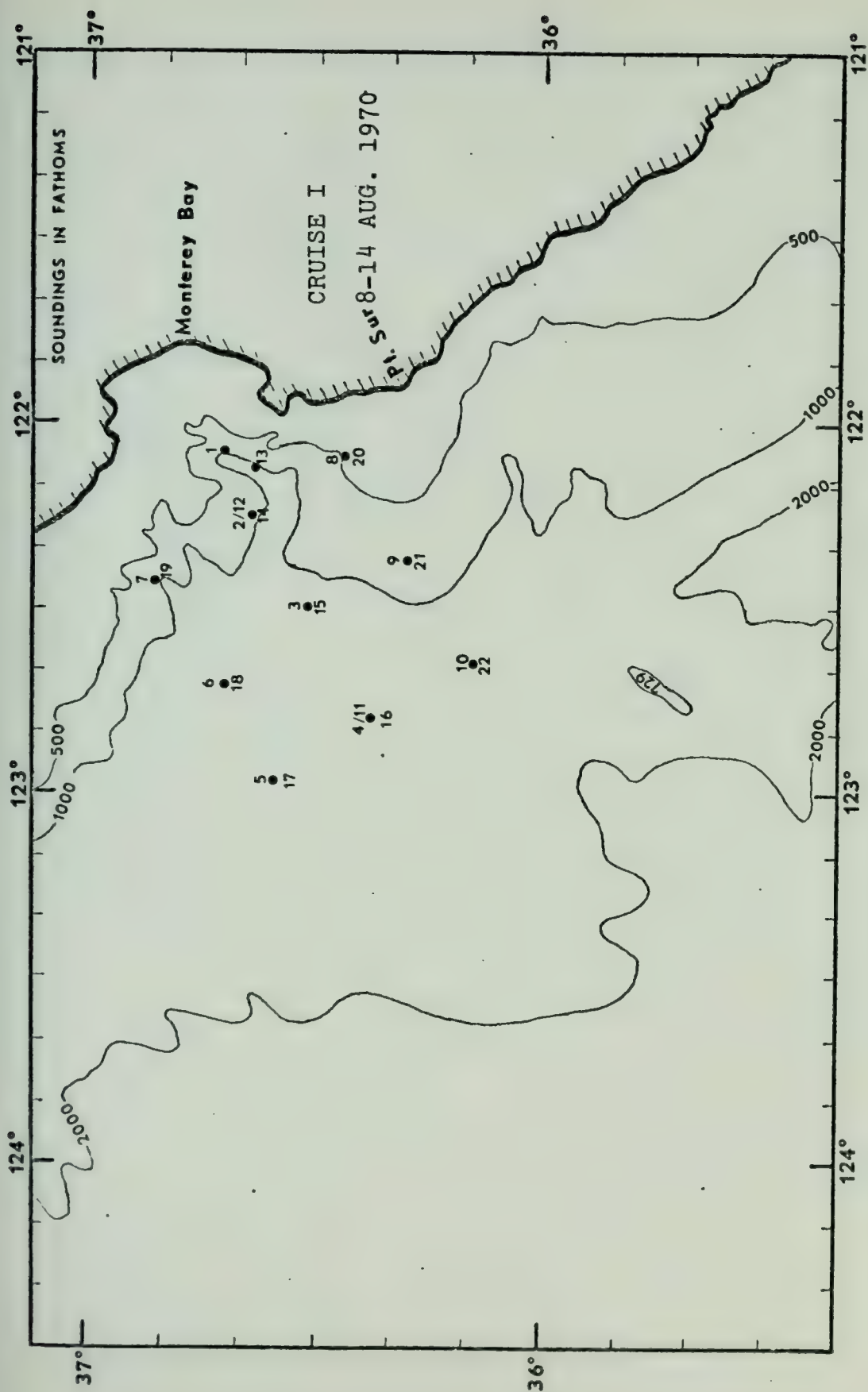


Fig. 5. Oceanographic stations occupied during Cruise I.

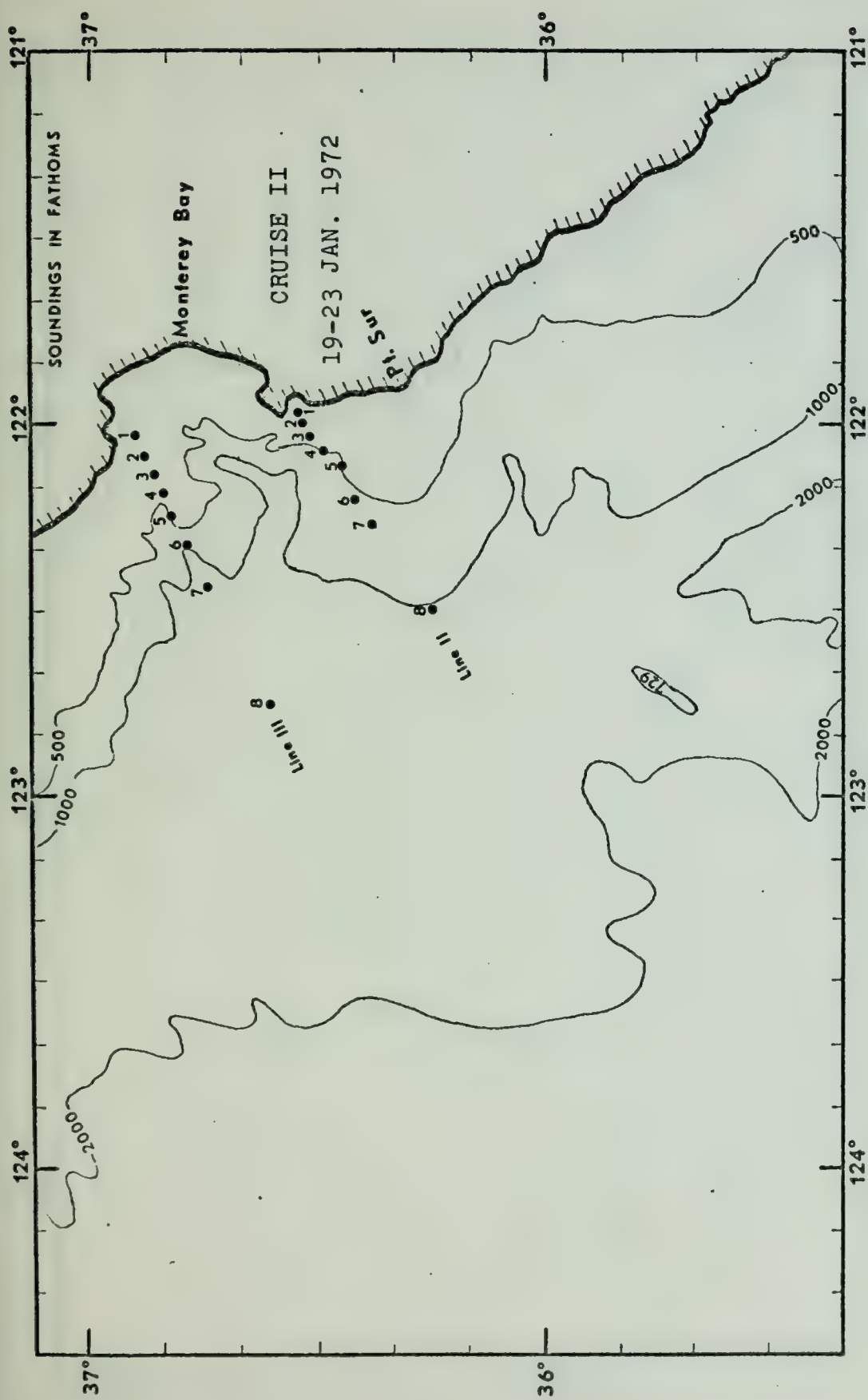


Fig. 6. Oceanographic stations occupied during Cruise II.

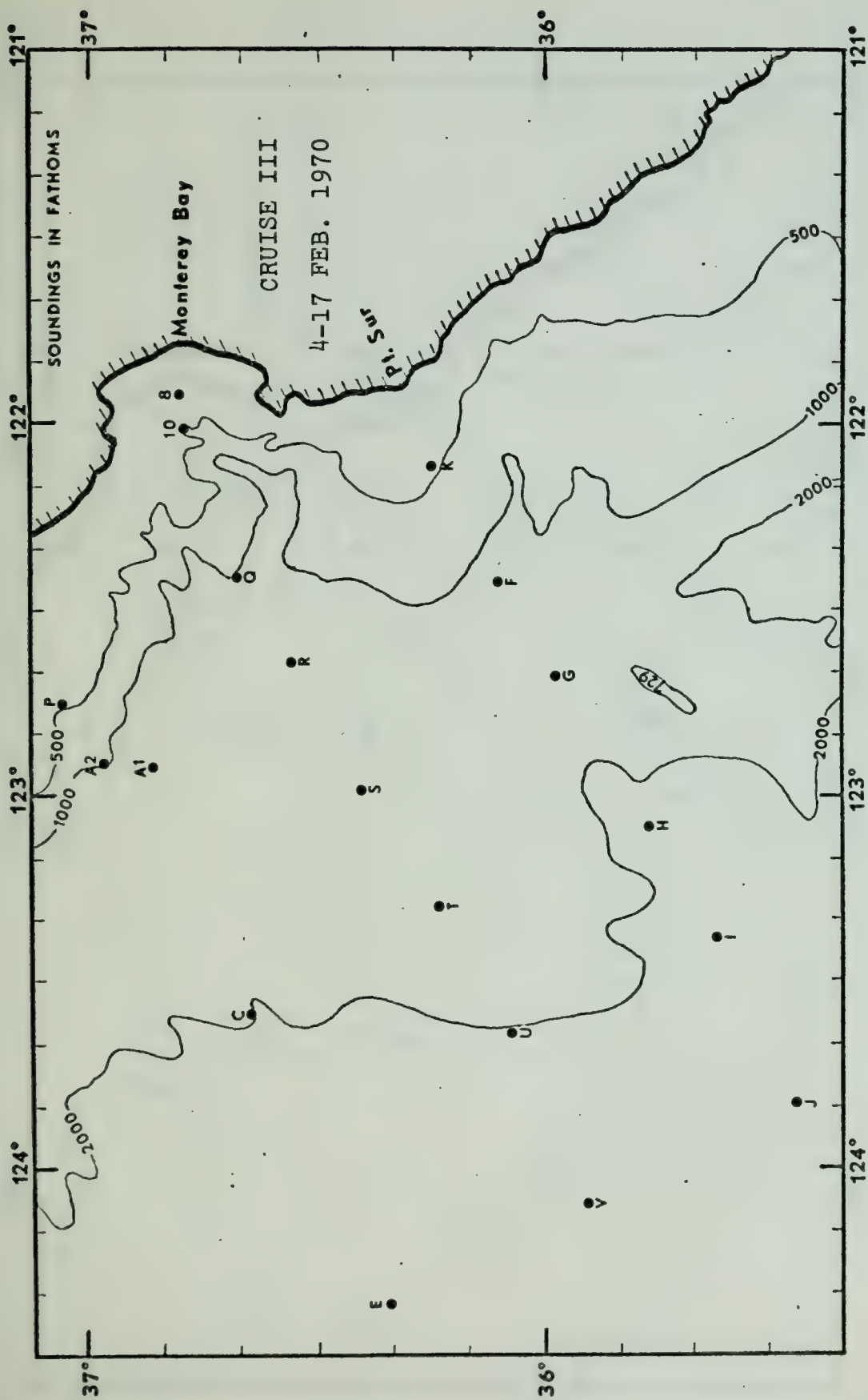


Fig. 7. Oceanographic stations occupied during Cruise III.

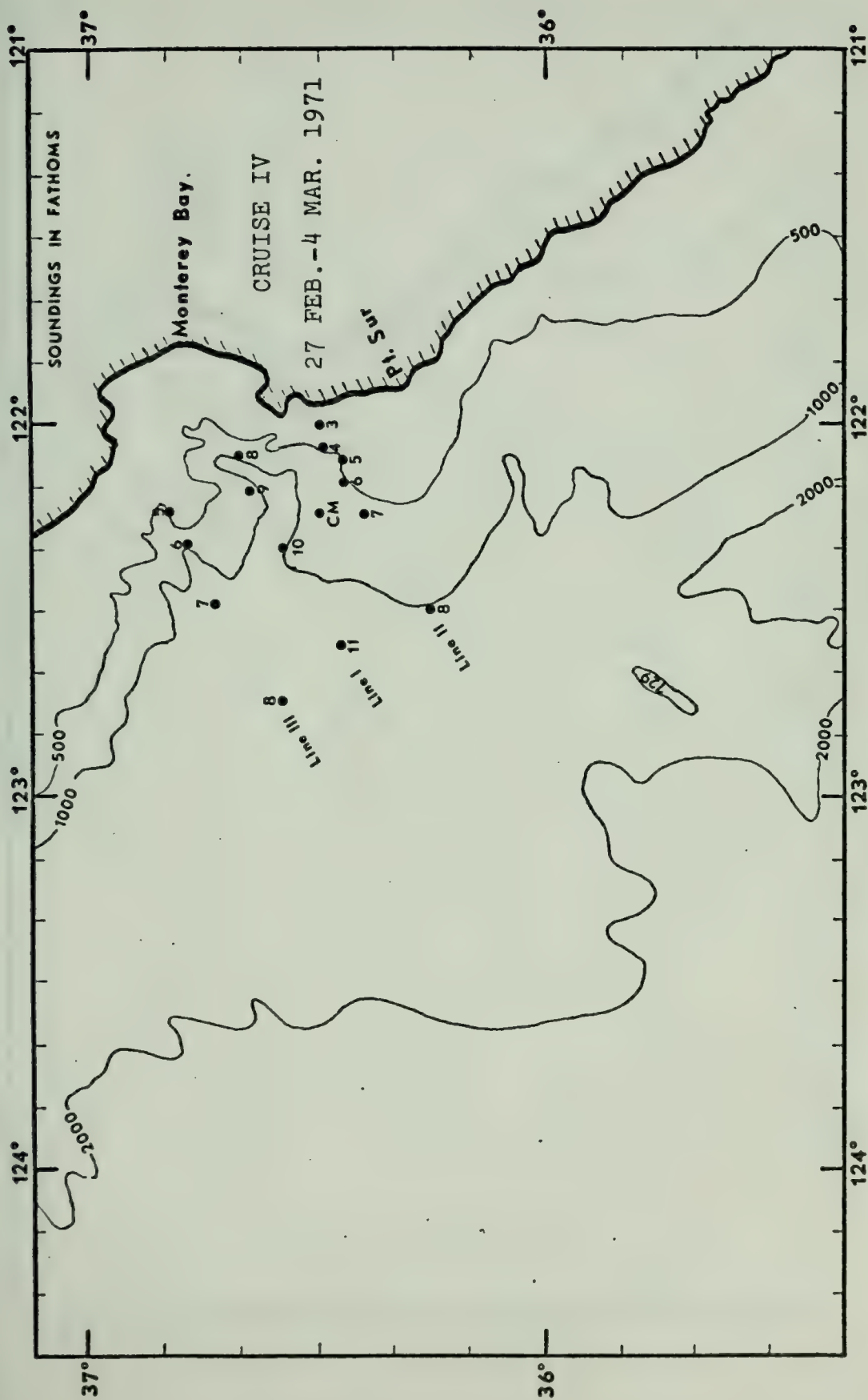


Fig. 8. Oceanographic stations occupied during Cruise IV.

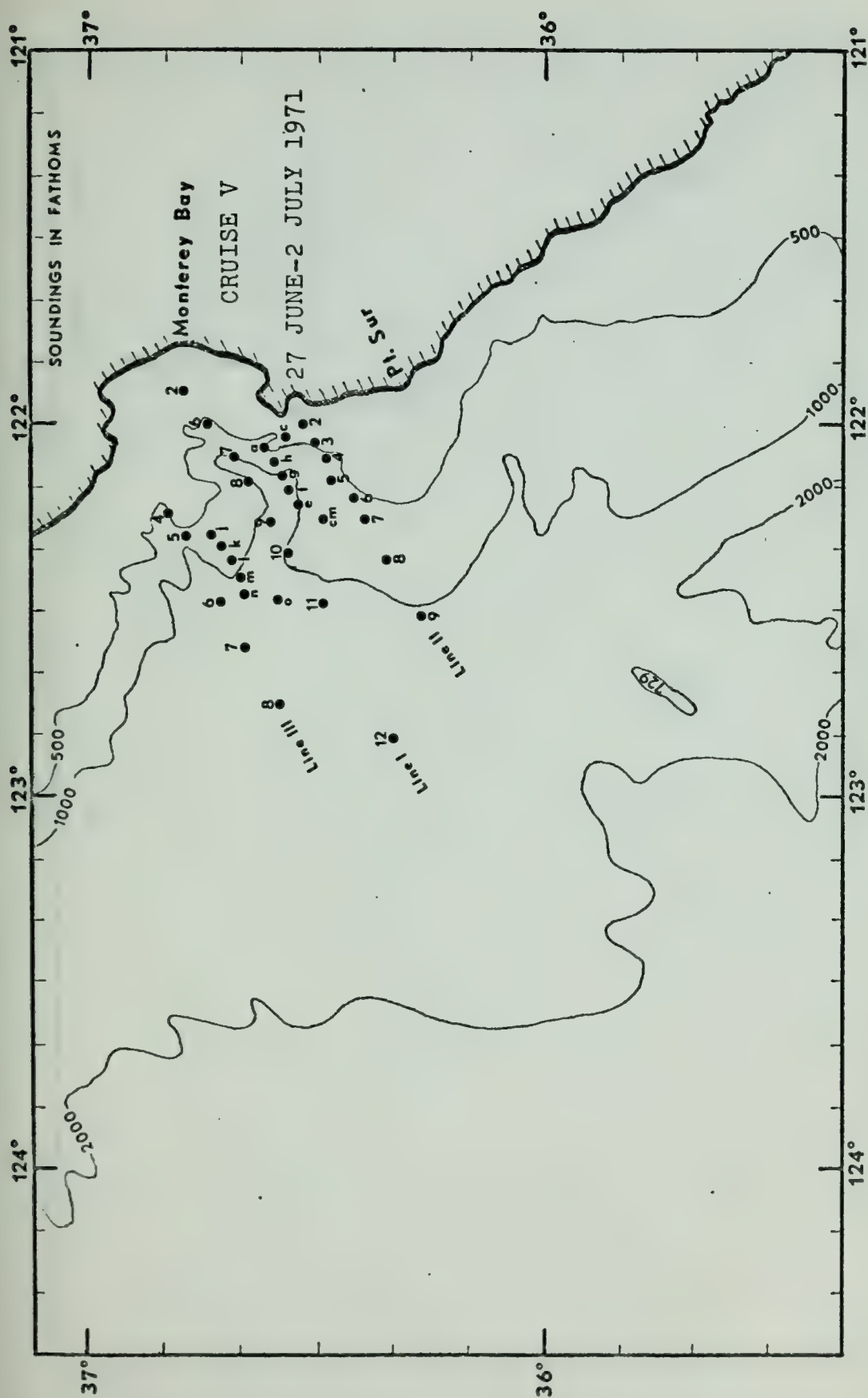


Fig. 9. Oceanographic stations occupied during Cruise V.

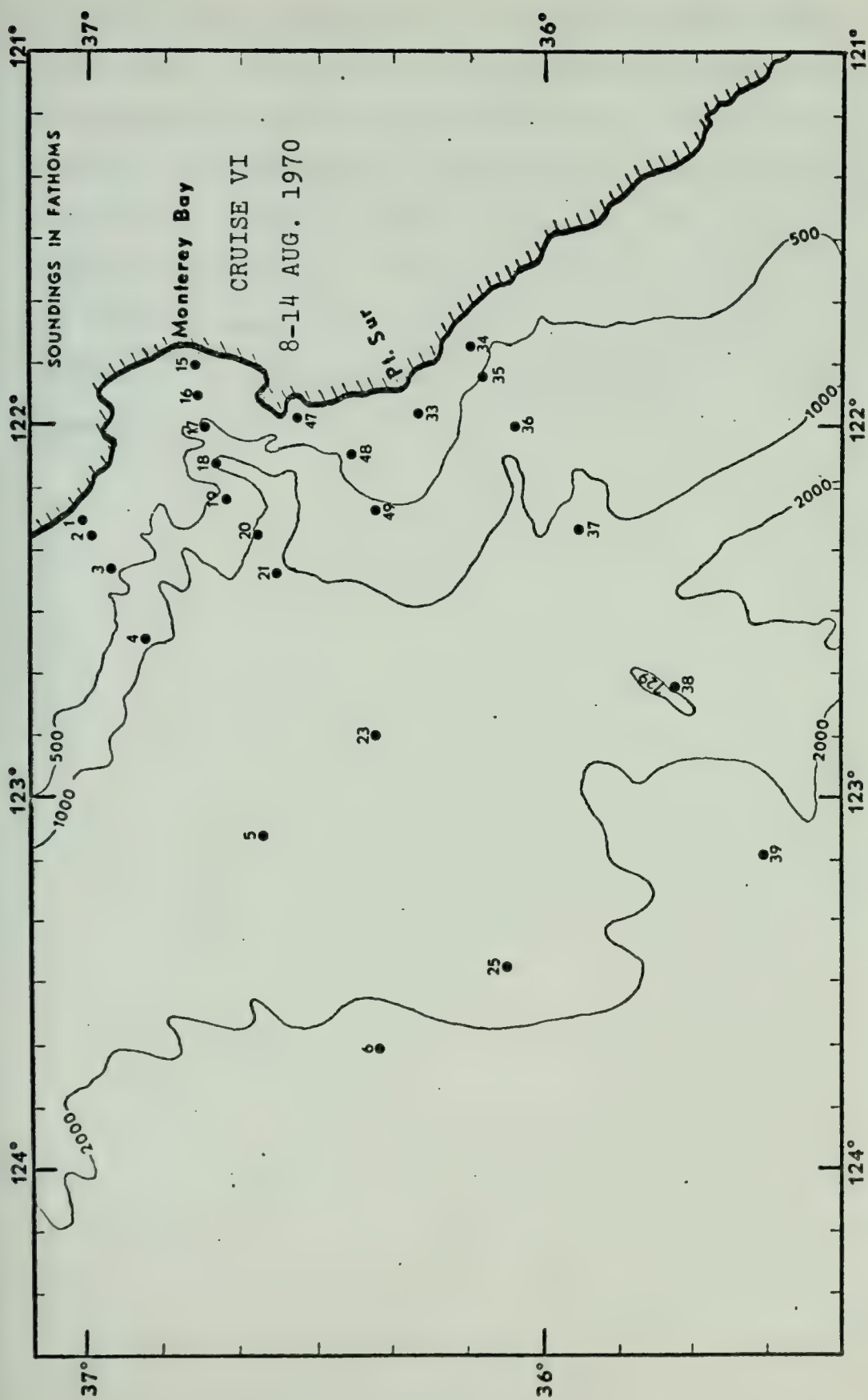


Fig. 10. Oceanographic stations occupied during Cruise VI.

research vessels using the Bissett-Berman model #9006 salinometer. The accuracy of the salinity determinations is generally on the order of ± 0.01 ‰. The data for all stations are contained in Appendixes B-G, which furthermore contain the computed values of Sigma-t. The values were computed by means of program "HYDRO" developed for use with the IBM 360 computer by the U.S. Navy Postgraduate School Department of Oceanography. Program HYDRO is presented in Appendix A.

IV. ANALYSIS

A. PRESENTATION OF DATA

Considerable time and effort were spent on a critical review of the temperature and salinity data. This was considered essential since the data had been collected mainly by inexperienced personnel. Temperature-salinity curves were prepared for each station and used for discovering possible conspicuous errors. In addition, these T-S curves were used to determine the percentage of southern water in the area during different seasons of the year. The distribution of southern water is presented graphically in vertical sections along transects approximately normal to the coast.

Vertical cross sections of salinity and temperature along latitudinal transects were prepared for the purpose of determining the distribution of properties in the area, and as an aid for detecting upwelling. In addition, charts showing the horizontal distribution of temperature and salinity at the surface and at 200 m were prepared for the same reasons cited above.

Charts depicting geostrophic flow at the surface and at 200 m were prepared using 600 m as the reference level. The dynamic method for computing geostrophic flow and the selection of the reference level are discussed in the next section. It should be noted that the geostrophic flow

patterns are represented by lines of mean flow instead of contours of dynamic height anomalies which are used by many authors. Small numerals integral to the flow lines indicate current speeds in cm/sec.

B. THE GEOSTROPHIC CURRENT

Geostrophic computations, also often referred to as dynamic computations or the dynamic method, are discussed in any elementary physical oceanography text, for example, Neumann and Pierson (1966). Fomin (1964) discusses in great detail the application and the limitations of the dynamic method. What might be called the classic computational scheme is based on an equation originally derived from Bjerknes circulation theorem (1900) by Sandstrom and Helland-Hansen (1903). However, the resulting equation is commonly referred to in the literature as the Helland-Hansen equation and it has been used extensively in oceanography to compute the relative field of currents from the observed field of mass. The equation, written in terms of the horizontal pressure gradient of the geopotential between two levels P_1 and P_2 is,

$$V_2 - V_1 = \frac{\int_{P_1}^{P_2} \alpha_A dP - \int_{P_1}^{P_2} \alpha_B dP}{f\Delta X} \quad (1)$$

where

$f = 2\omega \sin \phi$ is the Coriolis parameter (1/sec)

ω = the angular velocity of the earth (radians/sec)

ϕ = the geographic latitude (degrees)

α = specific volume [cm^3/gm], subscripts A and B refer to stations A and B separated by distance ΔX]

$(V_2 - V_1)$ = the horizontal velocity at P_1 relative to the level P_2 (cm/sec)

ΔX = the distance between stations (kilometers)

P = pressure (decibars)

The geopotential difference between two levels in the ocean is determined by the integrals in the right-hand term of Equation 1. The integrals are numerically evaluated from vertical density distributions, determined from the measured vertical temperature and salinity structure and the equation of state. The measured temperature and salinity structure at two stations can be used in this way to compute the mean horizontal gradient in geopotential along an isobaric surface. Then Equation 1 can be evaluated to give the mean geostrophic flow normal to the horizontal line joining the two stations.

From the observed mass distribution only the relative geopotential with respect to the sea surface and hence the

relative velocity field can be derived. In order to arrive at the absolute current, either the absolute geopotential field or the absolute velocity must be known at least at one level between two adjacent stations (Neumann and Pierson, 1966). It is common practice to satisfy this requirement by assuming a depth where the currents become zero or by inferring it from considerations of continuity. This depth is commonly referred to as the level of no motion or the reference level.

What constitutes the proper reference level is open to question (Fomin, 1964). Many reference levels have been used to compute surface currents (Neumann and Pierson, 1966). Reid (1958) used a reference level of 500 db in the California Current region. Sverdrup and Fleming (1941) also used a 500 db reference level for dynamic computations in a section off Southern California. In a study of the California Current regime north of San Diego, Reid, Swartzlose and Brown (1963) showed that geostrophic currents computed with respect to a 500 db reference level compared favorably with surface currents independently measured by drogues. Stommel (1965) summarized the problem of selecting a reference level (page 20):

Thus the choice of the reference level for geostrophic calculations becomes mostly a matter of taste, and we should admit that that is ultimately intolerable. The determination of the level of no motion is not a matter for debate, but for direct measurement.

There are simply not sufficient direct current measurements in the oceans to select suitable reference levels. Adding to the complexity of the problem is the fact that even if there were direct measurements in the ocean, only those in the particular flow regime under study would be useful. Fomin (1964) shows that in cases where the horizontal velocity approaches zero at some depth and remains nearly so with increasing depth, it may be better to select the shallower reference level of low velocity rather than a substantially deeper level, thus reducing computational errors. He point out that in some cases the selection of a deep reference level may completely distort the computed currents. For this study a reference level of 600 m was selected which permitted a substantially greater number of stations to be used. Stommel (1965) states (page 19), "Fortunately, the choice of reference level has less effect upon velocity in the near surface layer than on those of deep water."

C. LIMITATIONS OF THE DYNAMIC MODEL

Use of Helland-Hansens' formula to infer absolute currents suffers from several limitations (Fomin, 1964). Use of the dynamic method for this is based on the following assumptions:

- (1) The flow is geostrophic (frictionless and non-accelerated).

Lim. of Dyn Method

(1) The flow is geostrophic (frictionless & unaccelerated)

(2) The horizontal pressure gradient force and the horizontal velocity become negligible at a moderate depth below the sea surface. In addition, either the depth where the horizontal velocity becomes negligible must be known, or the horizontal velocity remains negligible with increasing depth.

Newmann and Pierson (1966) warn against the uncritical use of the dynamic method. They state (page 182),

Nothing more can be expected of this method than its simple assumptions permit. This, however, is true for all theoretical approaches, and these critical remarks neither inflate nor depreciate the value of simple analytical attempts such as the "classical method of dynamic computations," so long as their limitations or restrictions are kept well in mind.

However, experience has shown the dynamic method to be highly useful and "reliable" in deep oceans. One outstanding example of the computation of an absolute current profile, using the dynamic method is a study of the currents in the Straits of Florida by Wüst (1924), (as cited by Sverdrup, Johnson and Fleming, 1942).

V. RESULTS

A. REPRESENTATION OF CURRENTS

In the treatment of the data the usual convention of first describing the temperature and salinity distribution will not be followed. Instead, the results of the dynamic computations are presented first, since a discussion of the water masses will be simplified if the character of the flow has first been described. In addition, the results are presented in a logical order according to season of year as follows:

Winter (or Davidson Current Season)

Cruise I----8-14 November 1970

Cruise II---19-23 January 1972

Cruise III--4-17 February 1970

Cruise IV---27 February-4 March 1971

Early Summer (or Upwelling Season)

Cruise V----27 June-2 July 1971

Late Summer (or end of Upwelling Season, beginning
of Oceanic Season)

Cruise VI---8-14 August 1970

It is recognized that there are uncertainties which arise when attempting to draw conclusions about the circulation computed from the dynamic topography. Of major importance in this regard is the influence of internal waves. Defant (1961) points out the fact that internal waves distort the details of the mass field by periodically displacing the water masses in a water column. As a result,

these periodic variations in ocean structure will show in the dynamic evaluations. However, it cannot be doubted that the currents derived from dynamic computations represent the general direction of the flow. For example, a broad view of the seasonal variation is shown by the mass transport (see Table 1, page 43), which agrees with gross features of the flow system shown for the corresponding cruises by the surface current charts. From the dynamic topography an approximately correct picture of the flow can be obtained, and an attempt can be made to verify this by a close study of the characteristics of the different water masses. It should be noted that construction of current charts is, in general, subjective. Due to the complexities involved in this current regime, they may be subject to more individual interpretation than is ordinarily required.

As stated previously, the currents are represented schematically by lines of mean flow instead of by contours of dynamic height anomalies. Small numerals integral to the lines of flow indicate the current speed in cm/sec.

B. SURFACE CURRENTS

Surface current patterns during winter (Cruises I, II, III and IV) are shown in Figures 11, 12, 13 and 14. The surface currents were similar in one respect during all four cruises. Near the coast, south of Monterey Bay, was a well defined current to the northwest which ran approximately parallel to the coastline. This was expected since

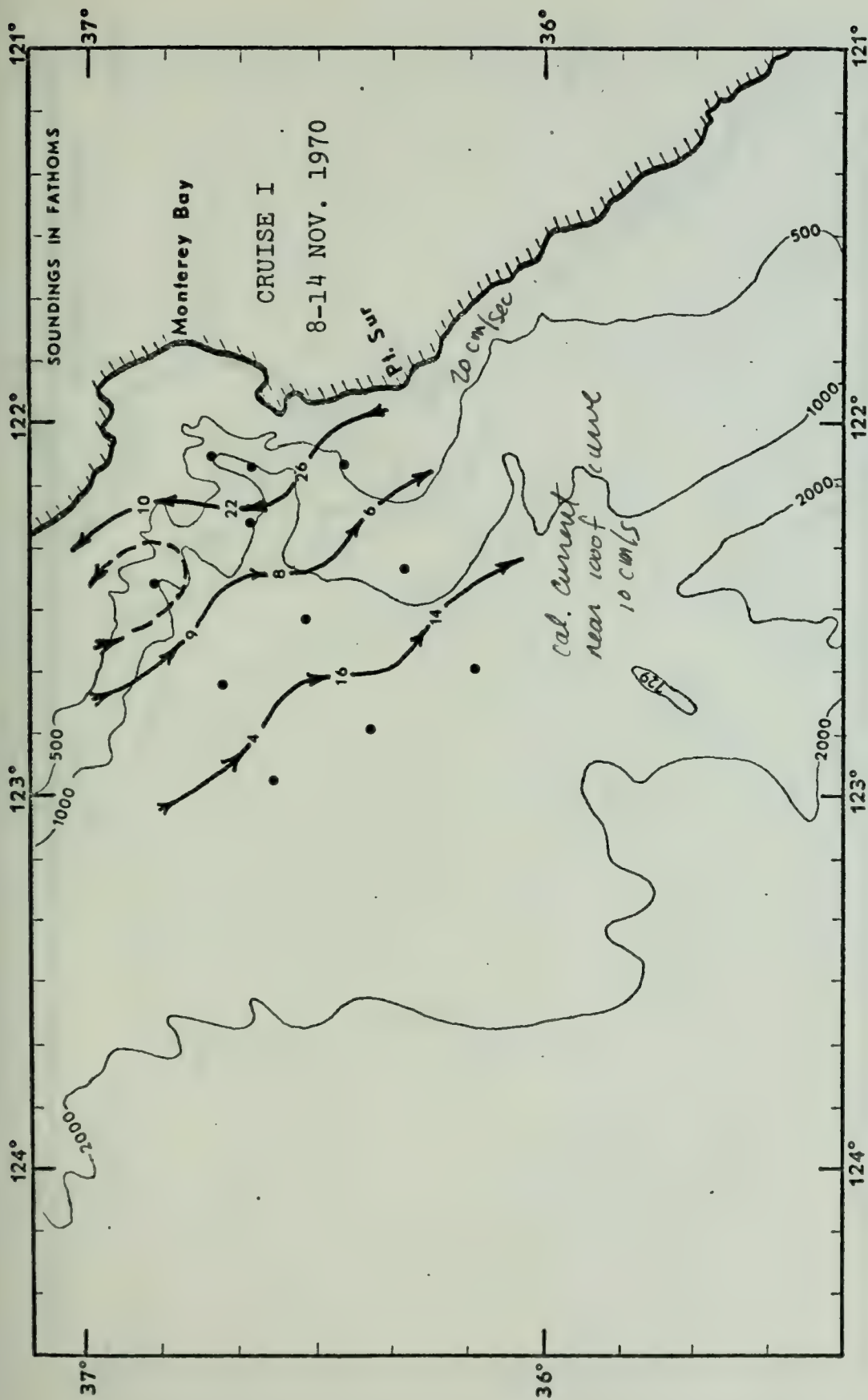


Fig. 11. Cruise I. Surface currents (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

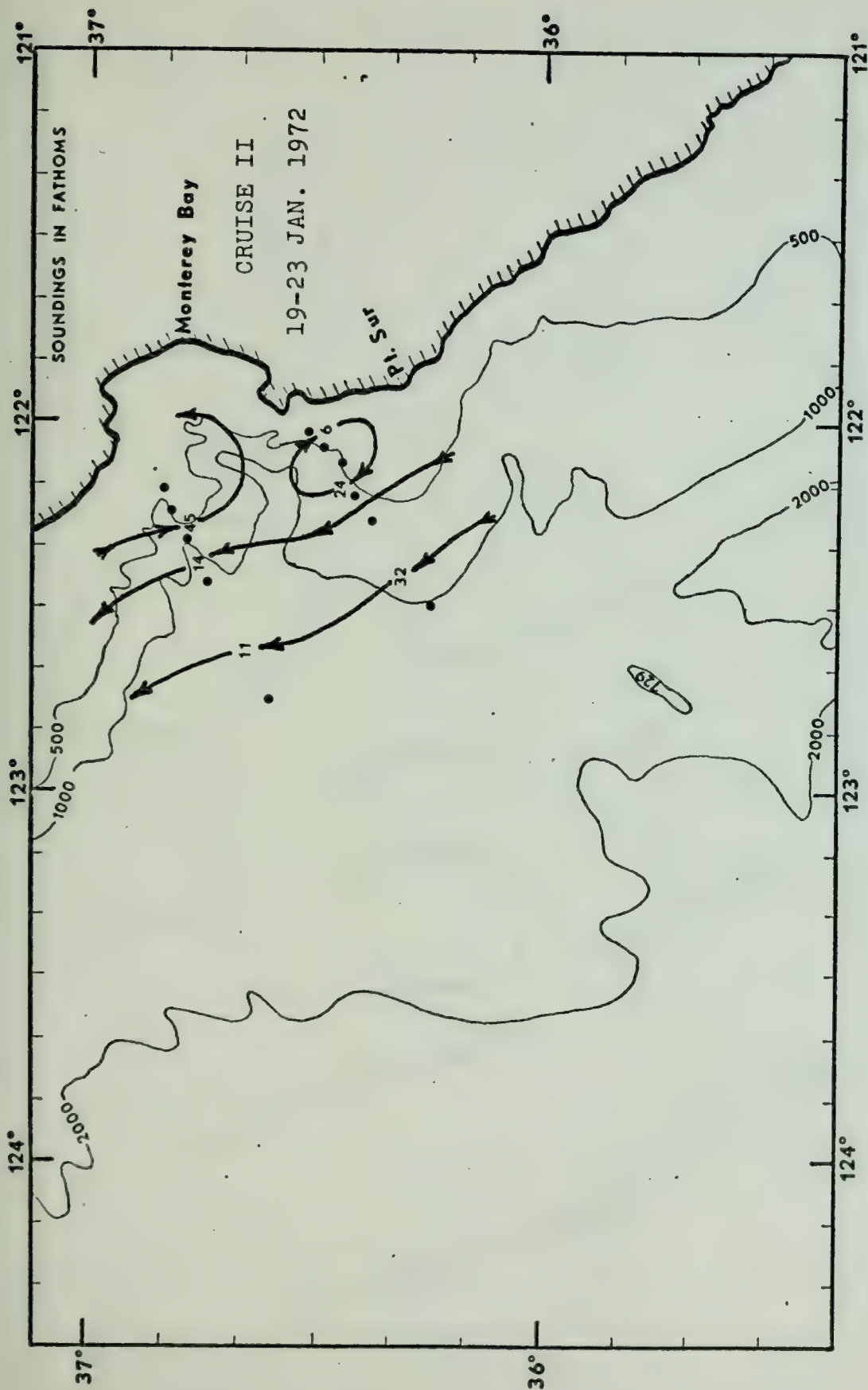


Fig. 12. Cruise II. Surface currents (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

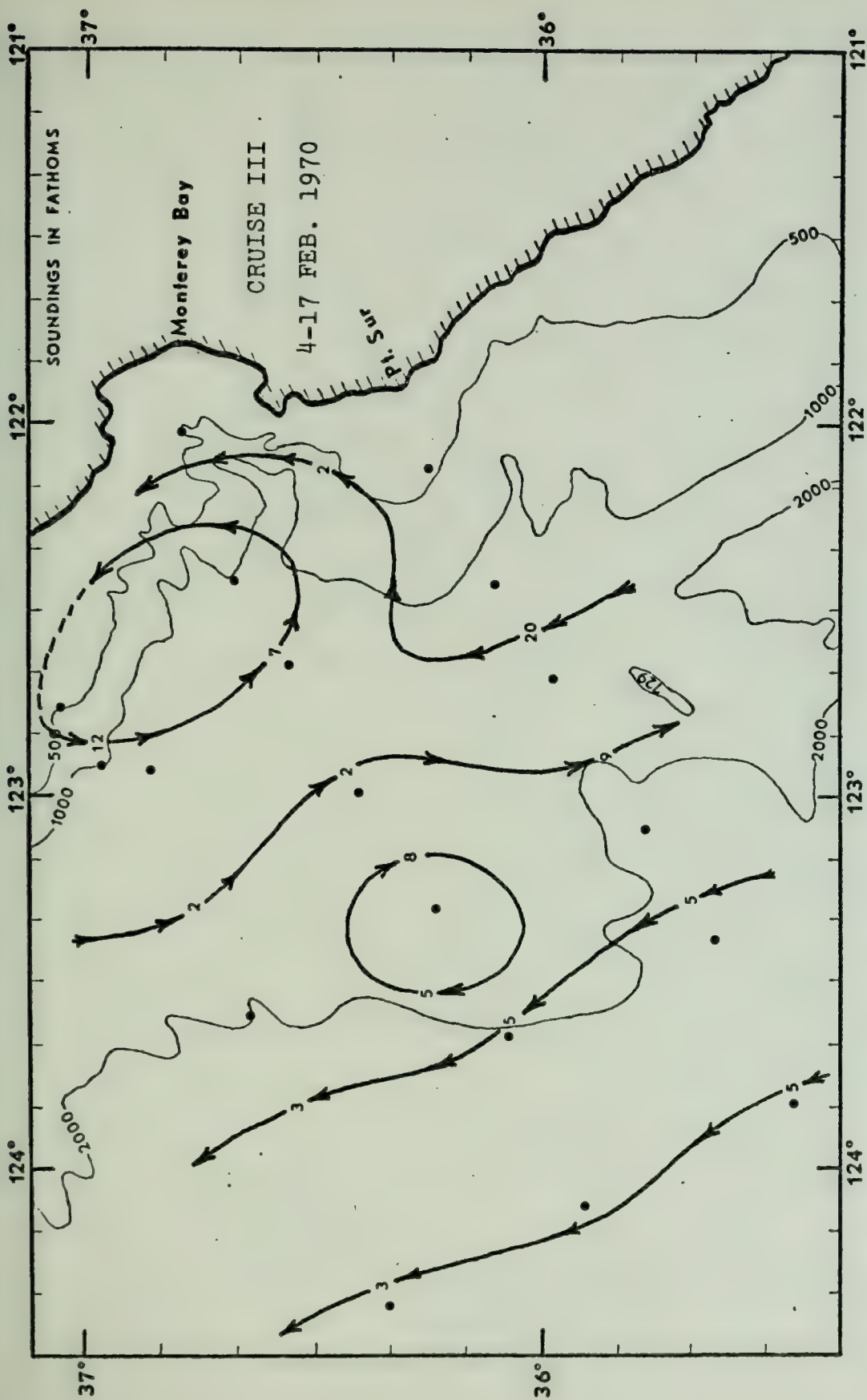


Fig. 13. Cruise III. Surface currents (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

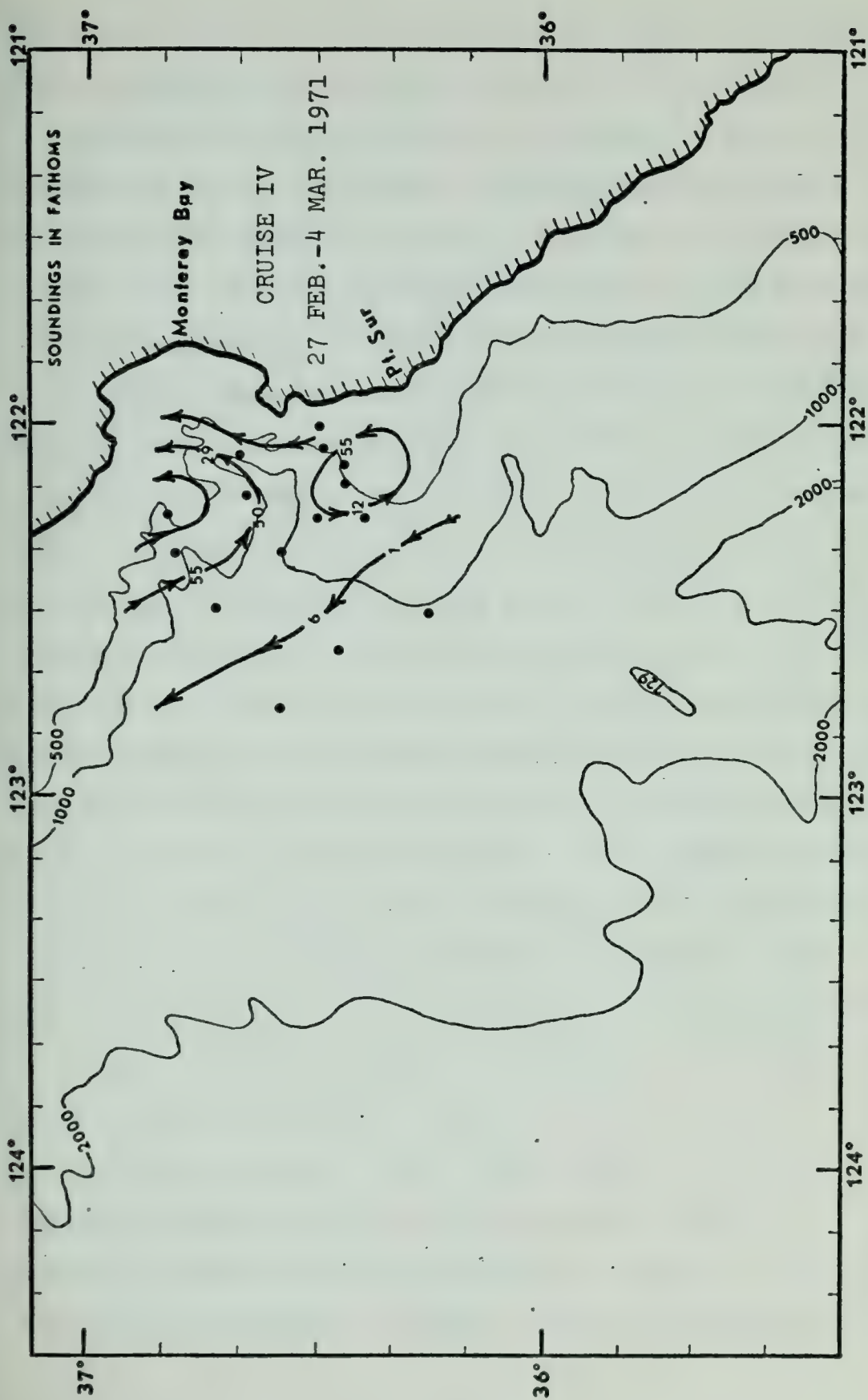


Fig. 14. Cruise IV. Surface currents (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

the winter season is normally the period when the Davidson Current reaches its maximum intensity at the surface.

Of greater interest was the variability of the flow throughout the winter season. The November 1970 cruise results, which depict conditions at the start of the winter season, show that the California Current is still evident relatively close to the coast near the 1000 fathom curve at an average speed of approximately 10 cm/sec. The near-shore poleward current was somewhat faster, averaging nearly 20 cm/sec and appeared to decelerate along the direction of flow. Results of the January 1972 and February 1971 cruises are remarkably similar, showing a well defined poleward offshore current and two distinct eddies; one near Monterey Bay, and the other just north of Pt. Sur. The northern eddies were cyclonic on both cruises. However, the southern eddy in January 1972 was anticyclonic, whereas the southern eddy in February 1971 was cyclonic. The offshore poleward flow was considerably higher in January 1972 (Cruise II), averaging nearly 20 cm/sec, whereas a relatively weak poleward current averaging less than 10 cm/sec was noted in February 1971 (Cruise IV). The chart for the February 1970 cruise shows several interesting details not evident on the other cruises. Overall weak poleward flow is indicated, even as far out as 110 nm from the coast. However, approximately 50 nm offshore a band of equatorward flow interlaces between separate bands of northerly flow.

This finger of current to the south appeared to accelerate in the direction of flow and was separated from the poleward flow on its western side by an anticyclonic eddy. Station spacing was not sufficiently dense to conclude whether small scale eddies were present on the eastern side of the equatorward current, or if simple lateral shear separated the oppositely directed currents.

Of particular interest on all four cruises was the observation that the bathymetry appeared to exert a definite influence on the current direction, especially coastward of the 1000 fathom curve.

Figure 15 shows the surface currents during early summer (Cruise V) for which overall weak, poleward flow is evident. However, the area is characterized by small scale cyclonic eddies (on the order of 10 miles) indicating the general degradation of the intensity of the Davidson Current at the surface. This appears to agree well with Kin'dyushev's (1970) observations. Also of interest is the finger of relatively strong equatorward flow between the nearshore eddies and the coast. Water mass analysis shows that this water is predominantly of Subarctic origin. This corroborates Skogsberg's (1936) observations that the California Current reaches the coast during the upwelling season.

Figure 16 shows the surface currents found on Cruise VI conducted during the late summer. The California Current was clearly evident at the stations farthest offshore.

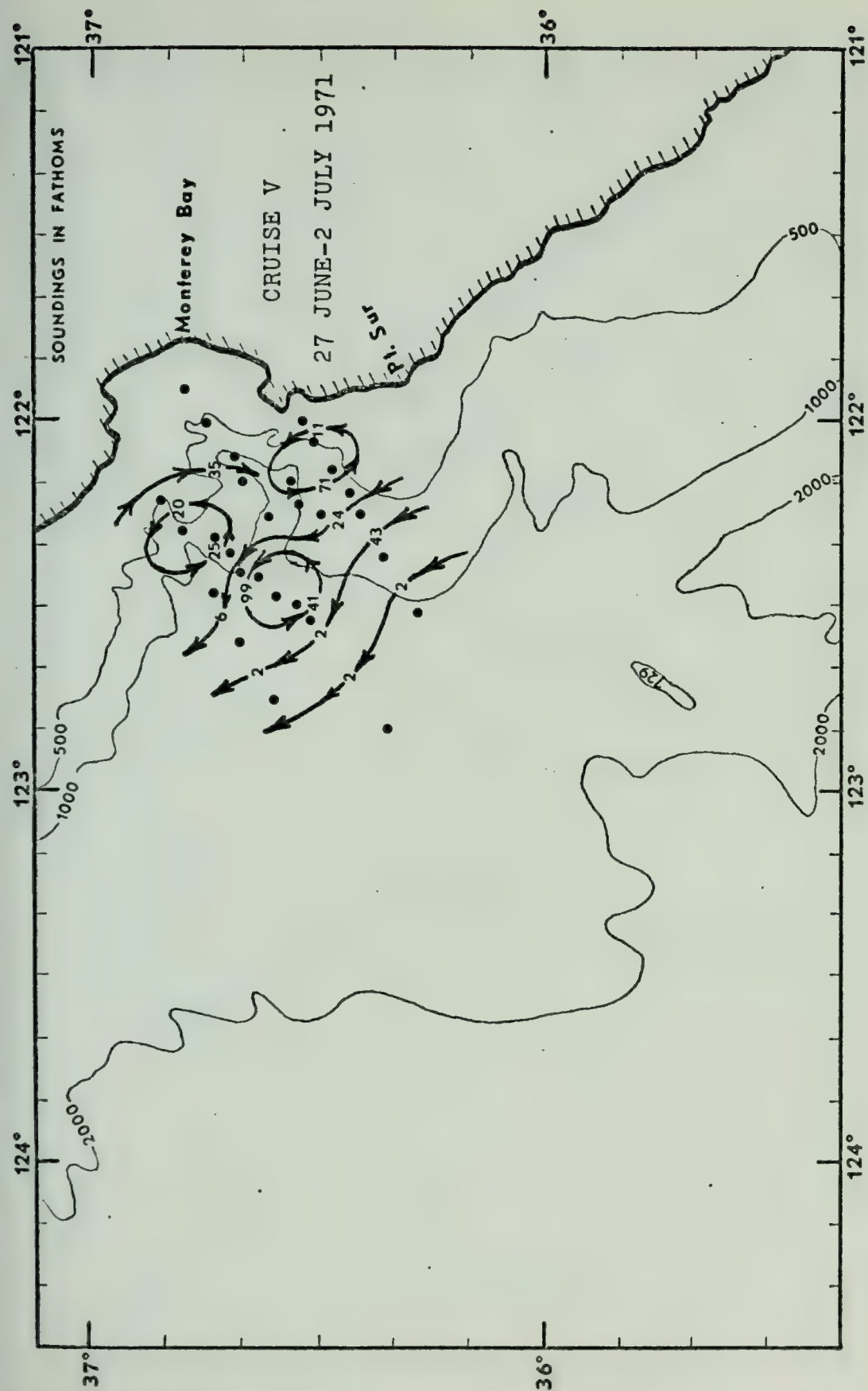


Fig. 15. Cruise V. Surface currents (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

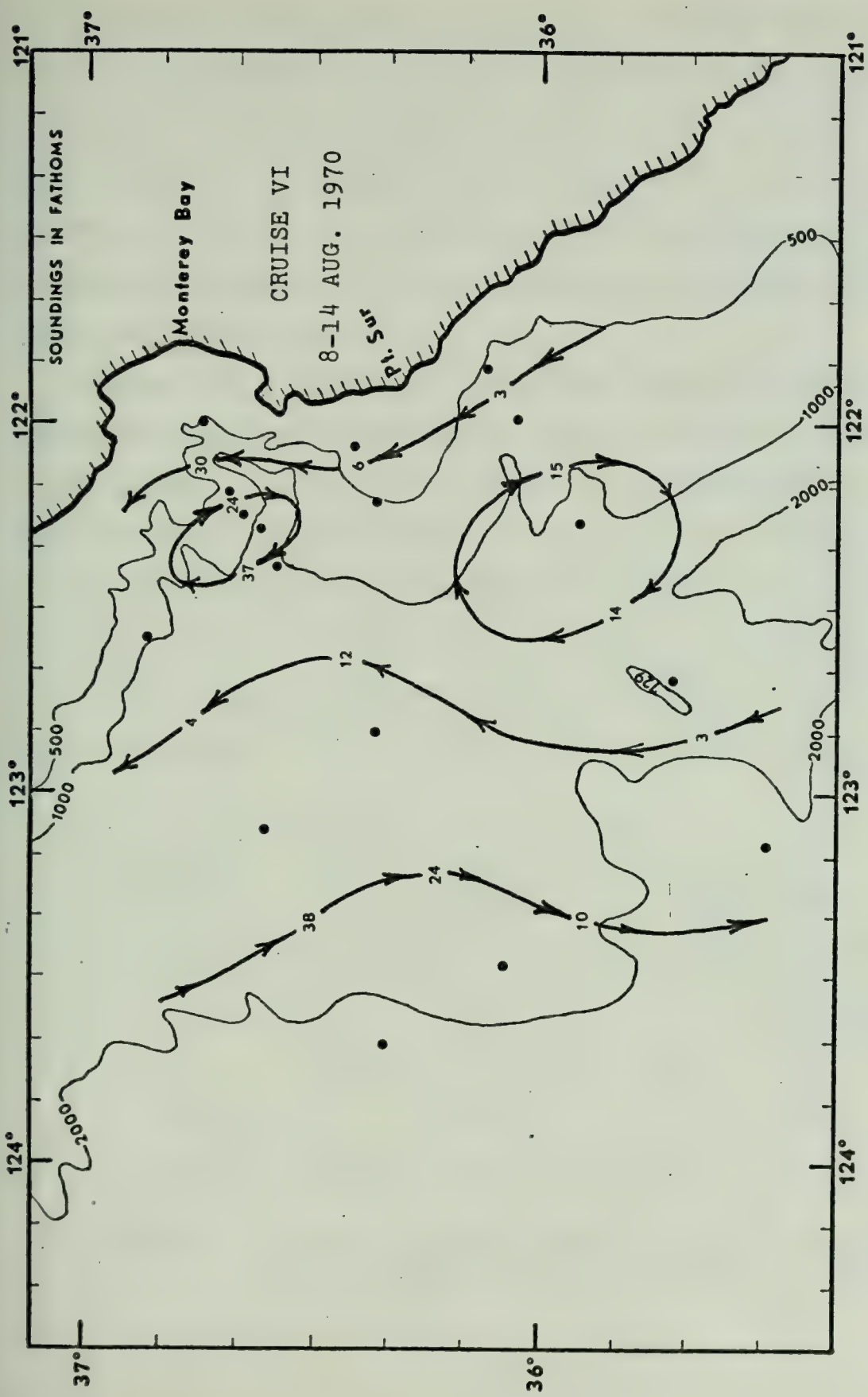


Fig. 16. Cruise VI. Surface currents (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

The Davidson Current was still dominant in the nearshore region and appeared to increase in speed along the direction of flow. Two large anticyclonic eddies were indicated; one near the mouth of Monterey Bay, and the other farther offshore south of Pt. Sur. Again, as with all previous cruises, bathymetry appeared to be an influential mechanism inside the 1000 fathom curve.

Table 1 is a compilation of volume transports between selected stations for Feb. 1970, June-July 1971, and Aug. 1970 cruises. The volume transport may be interpreted as indicating the predominant direction of flow between the stations; negative values indicating southward flow, and positive values indicating poleward flow. In order to form the best possible basis for comparison, matching station pairs of similar location were selected for each cruise.

CRUISE III FEB. 1970	CRUISE V JUNE-JULY 1971	CRUISE VI AUG. 1970
Stations Q and S	Stations III-5 & III-9	Stations 19 and 23
$\Delta X = 61 \text{ km}$	$\Delta X = 52 \text{ km}$	$\Delta X = 66 \text{ km}$
- 0.280	+2.160	+ 2.564

TABLE 1. Volume transport above 600 m ($10^6 \text{ m}^3/\text{sec}$) and distance ΔX west of the 1000 fm curve.

C. CURRENTS AT A DEPTH OF 200 METERS

At a depth of 200 meters (Figures 17-22) current speed and direction were remarkably similar to those found at the surface on all six cruises with few notable exceptions. During the winter season (Cruise III) the offshore surface anticyclonic eddy reversed its direction to cyclonic at 200 m. In addition, the eddy was found in the middle of a large band of poleward flow instead of between separate fingers on northerly and southerly flow as was the case on the surface. The only other notable exception occurred in the early summer cruise (Cruise V) where the northernmost eddy reversed directions between the surface and 200 m. It should be noted that these apparent eddy reversals may be a distortion of the geostrophic flow due to the influence of internal waves.

D. TEMPERATURE AND SALINITY AT THE SURFACE

Figures 23, 24, and 25 show that tongue-like distributions of temperature and salinity at the sea surface were encountered during all seasons of the year (Cruises III, V, and VI). During the winter season (Cruise III) a tongue of cold (less than 13°C) relatively fresh water was found stretching to the southeast between 40-60 nm offshore. A tongue of water with salinity less than 31 ‰ was also found near the mouth, and to the north of, Monterey Bay. A comparison with the surface flow (Fig. 13) shows that the tongue of cold relatively fresh water coincides with the

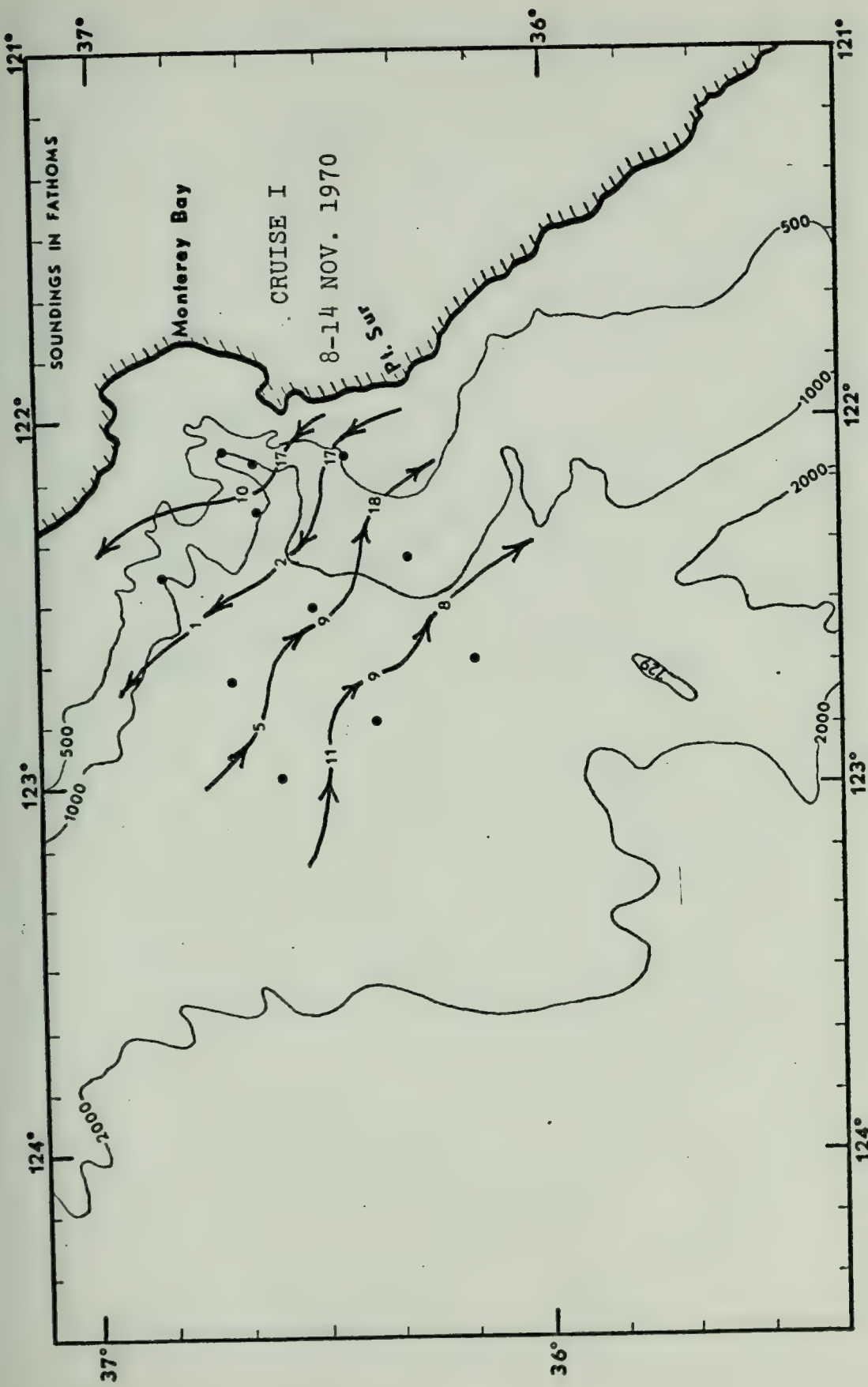


Fig. 17. Cruise I. Currents at 200 m (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

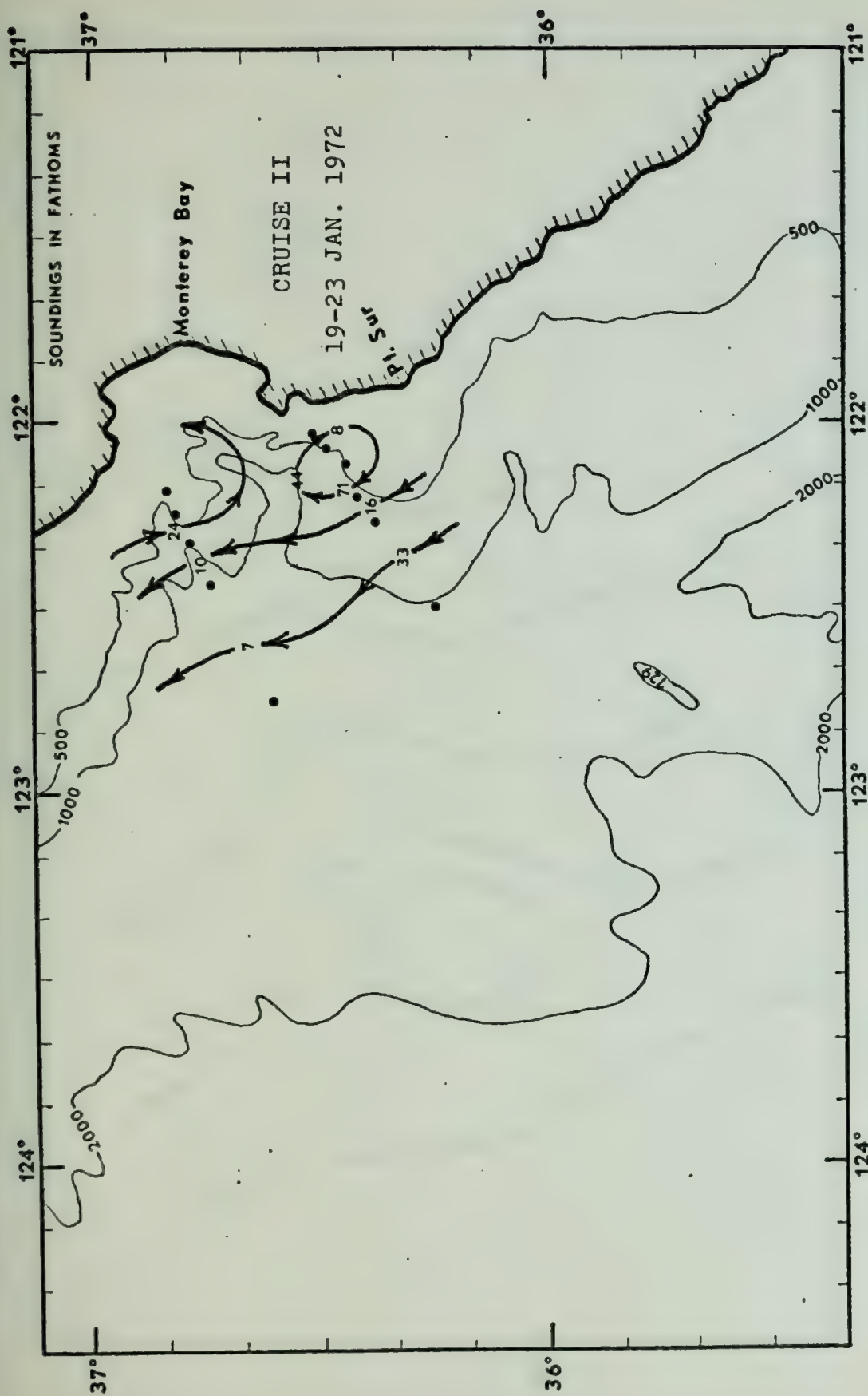


Fig. 18. Cruise II. Currents at 200 m (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

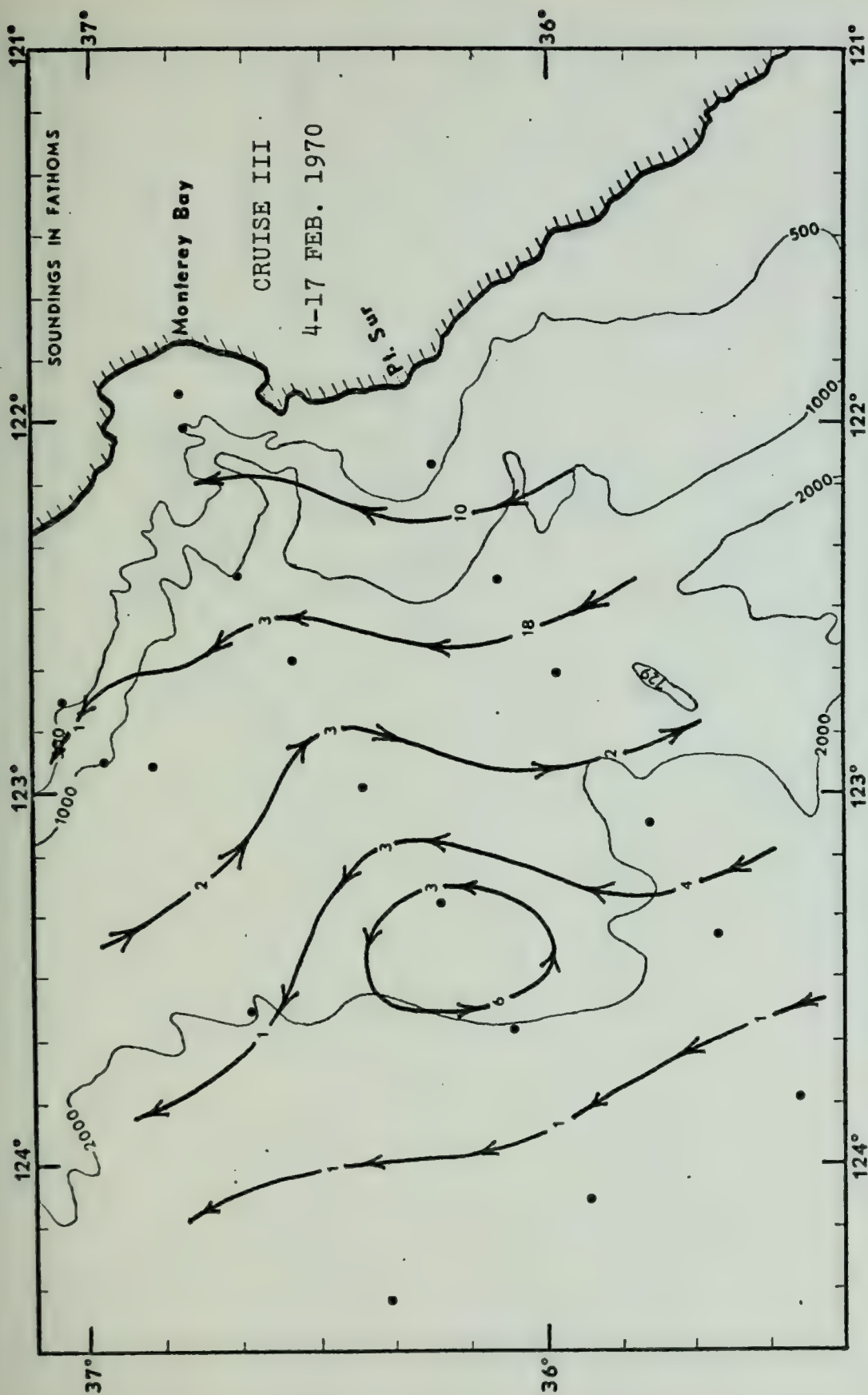


Fig. 19. Cruise III. Currents at 200 m (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.



Fig. 20. Cruise IV. Currents at 200 m (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

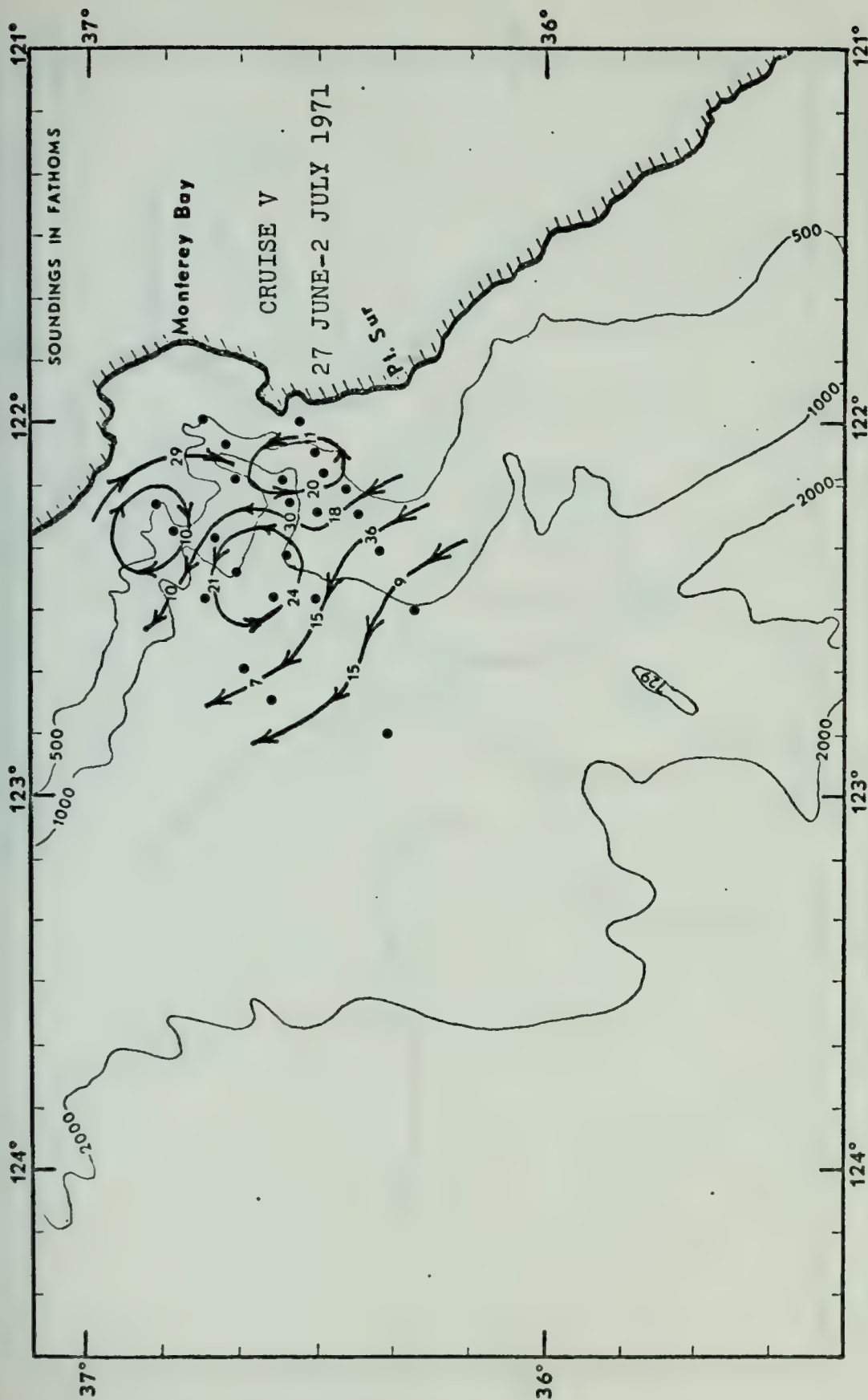


Fig. 21. Cruise V. Currents at 200 m (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

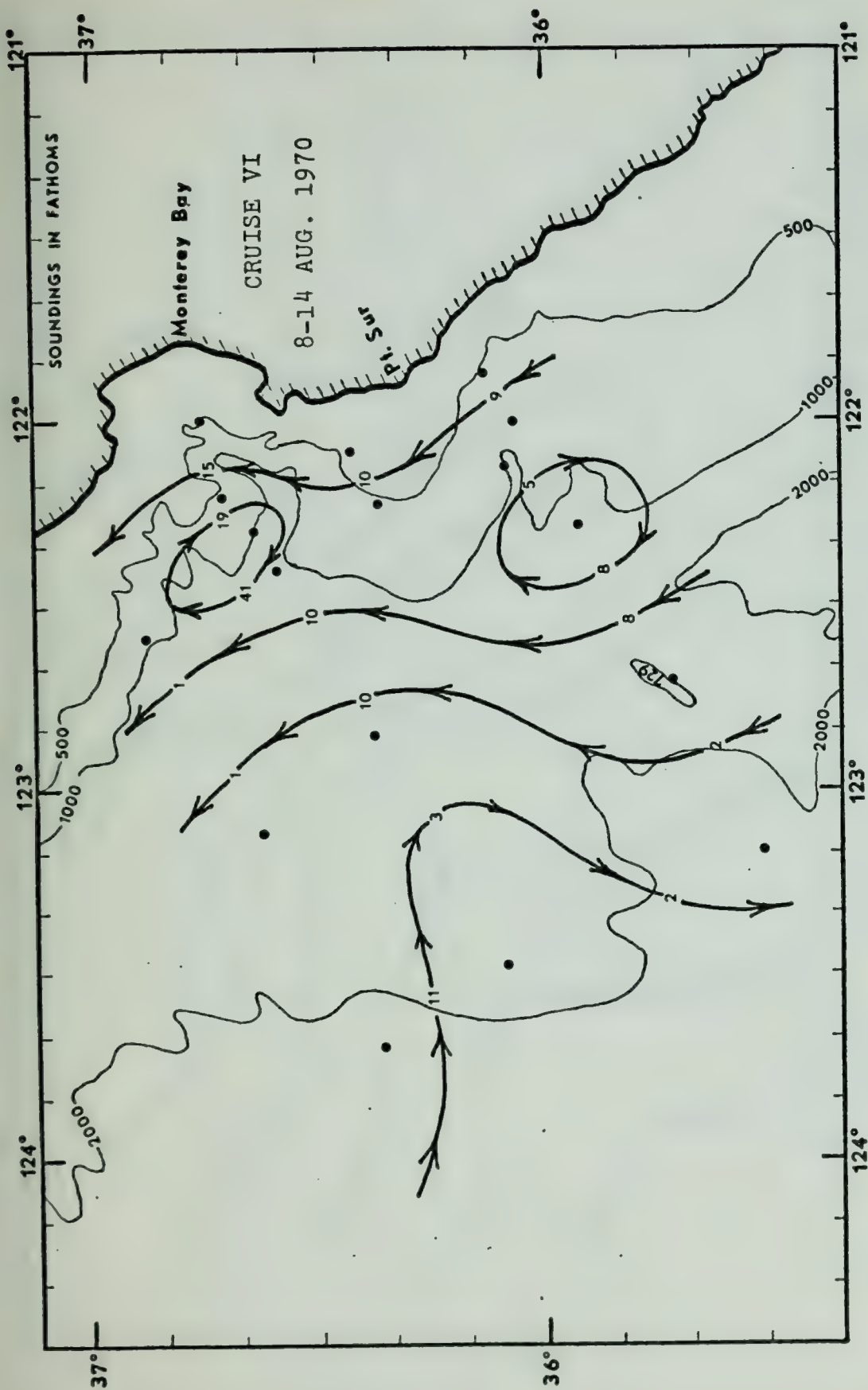


Fig. 22. Cruise VI. Currents at 200 m (relative to the 600 db reference level) represented by solid lines with arrows indicating direction of flow. Current speeds are in cm/sec.

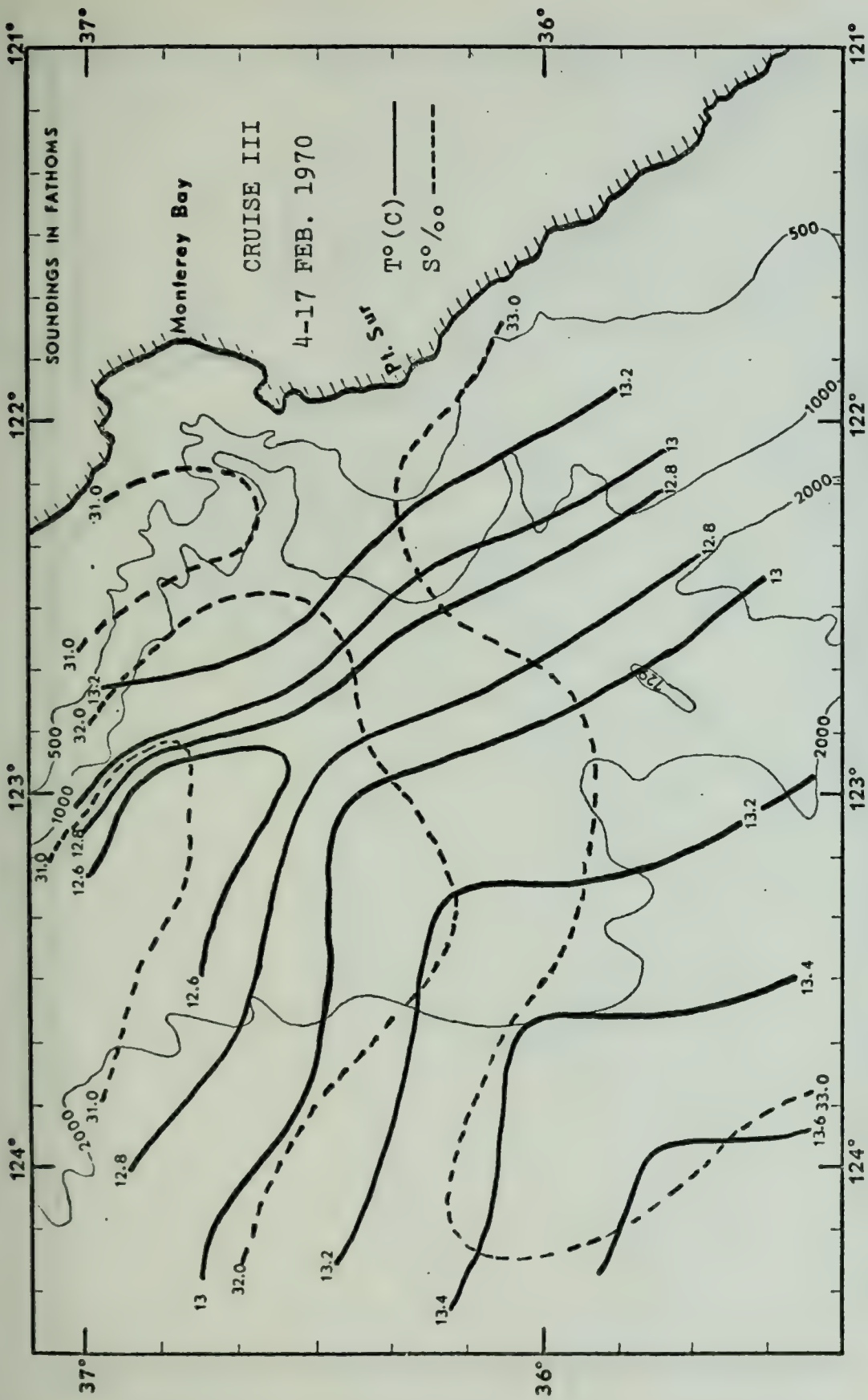


Fig. 23. Cruise III. Temperature ($^{\circ}C$) and salinity (‰) at the sea surface.

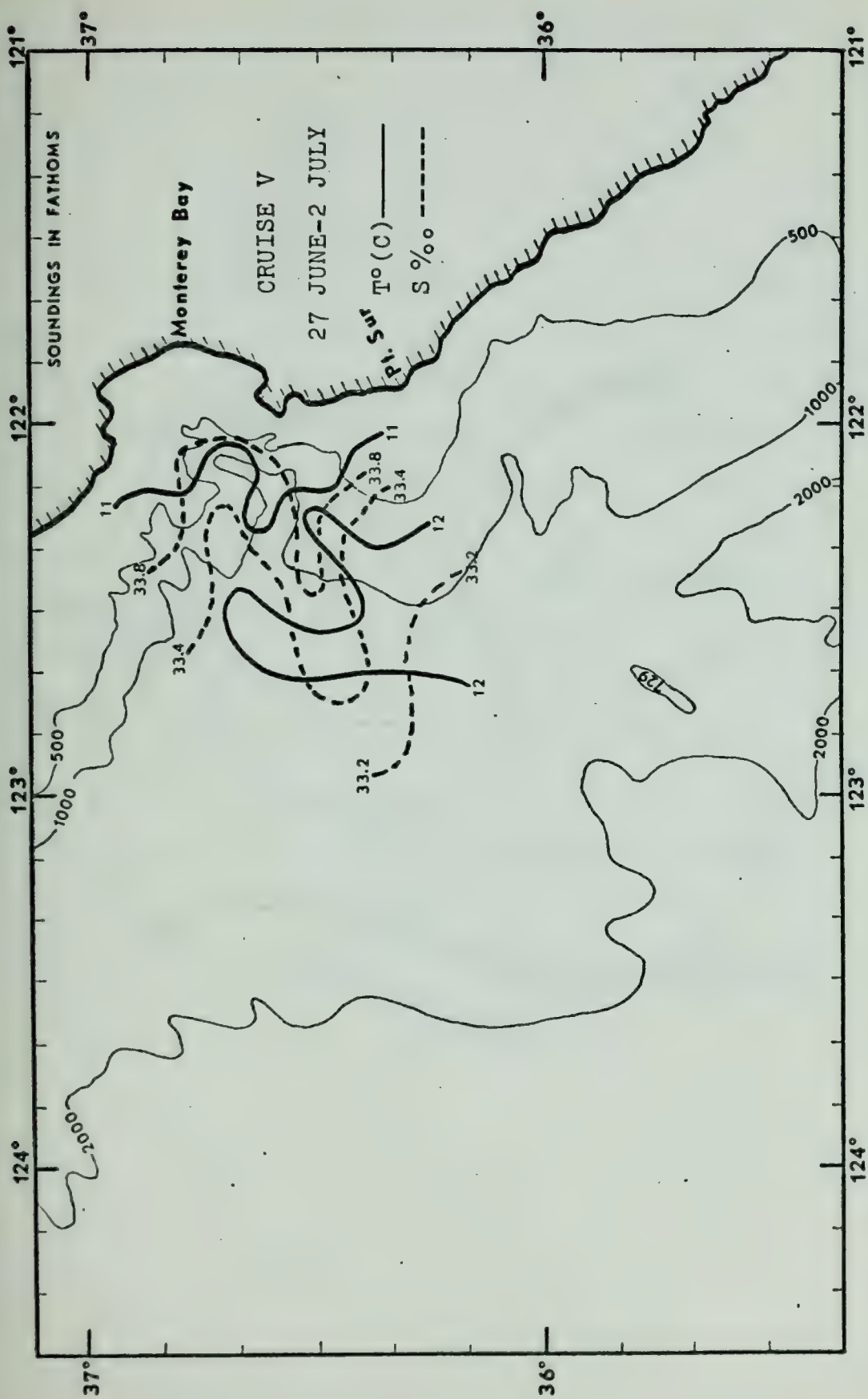


Fig. 24. Cruise V. Temperature (°C) and salinity (‰) at the sea surface.

offshore band of current flowing to the southeast. The nearshore tongue of low salinity water coincides with the nearshore cyclonic eddy which perhaps indicates the eddy may not be closed as conjectured, but may be a finger of the current from the north.

During the early summer cruise (Fig. 24) a band of low surface temperatures (less than 11°) stretched seaward from the coast to a distance of more than 15 miles. A tongue of water with salinities higher than 33.8‰ was found in the same region. These low surface temperatures and high surface salinities are most likely due to upwelling in the region. A comparison with the surface flow (Fig. 15) shows that the tongues of higher temperature coincide with the offshore bands of poleward flow.

Conditions found during late summer (Cruise VI) were somewhat similar to those found during early summer in that a tongue of relatively cold, high salinity water was encountered near the coast off Monterey Bay. As will be shown in later sections, this was apparently due to intermittent upwelling and indicates that the upwelling season had not completely ended. However, it is apparent from the considerably higher offshore temperatures that a transition to the oceanic season was taking place. A comparison with the surface currents (Figure 16) shows that the two eddies appear to be associated with areas where extreme bending of the isotherms occur, and with areas of relatively low salinity.

E. TEMPERATURE AND SALINITY AT 200 METERS

At a depth of 200 m (Figures 26, 27 and 28) the tongue-like projections of isotherms and isohalines, similar to those found at the surface, were noted during the early and late summer cruises. However, during the winter season (Cruise III) the isolines of temperature and salinity were more nearly parallel to the coast. The band of salinity minimum that bisected the region shows, upon comparison with the 200 m flow (Figure 19), that it conformed to the narrow finger of equatorward current. The offshore cyclonic eddy was nestled in the area of divergence of the 8.7°C isotherms, whereas the nearshore eddy coincided with a region of minimum temperature. It is believed that this small area, as well as the region of relatively cold, high salinity water near Pt. Sur were perhaps due to intermittent upwelling. This conclusion will be substantiated in later sections.

During early summer (Fig. 27) the extreme bending of the 7.6°C and 7.8°C isotherms intersected with the tongues of highest salinity and coincided with relatively high speed poleward flow nearest the coast (see Fig. 21). As will be shown in later sections, this was apparently a region of maximum intrusion of Equatorial Pacific water.

During late summer (Fig. 28) the lowest temperatures and salinities were found farthest from shore. A comparison with the 200 m flow (Fig. 22) shows that the offshore tongue-like intrusion of cold, relatively fresh water

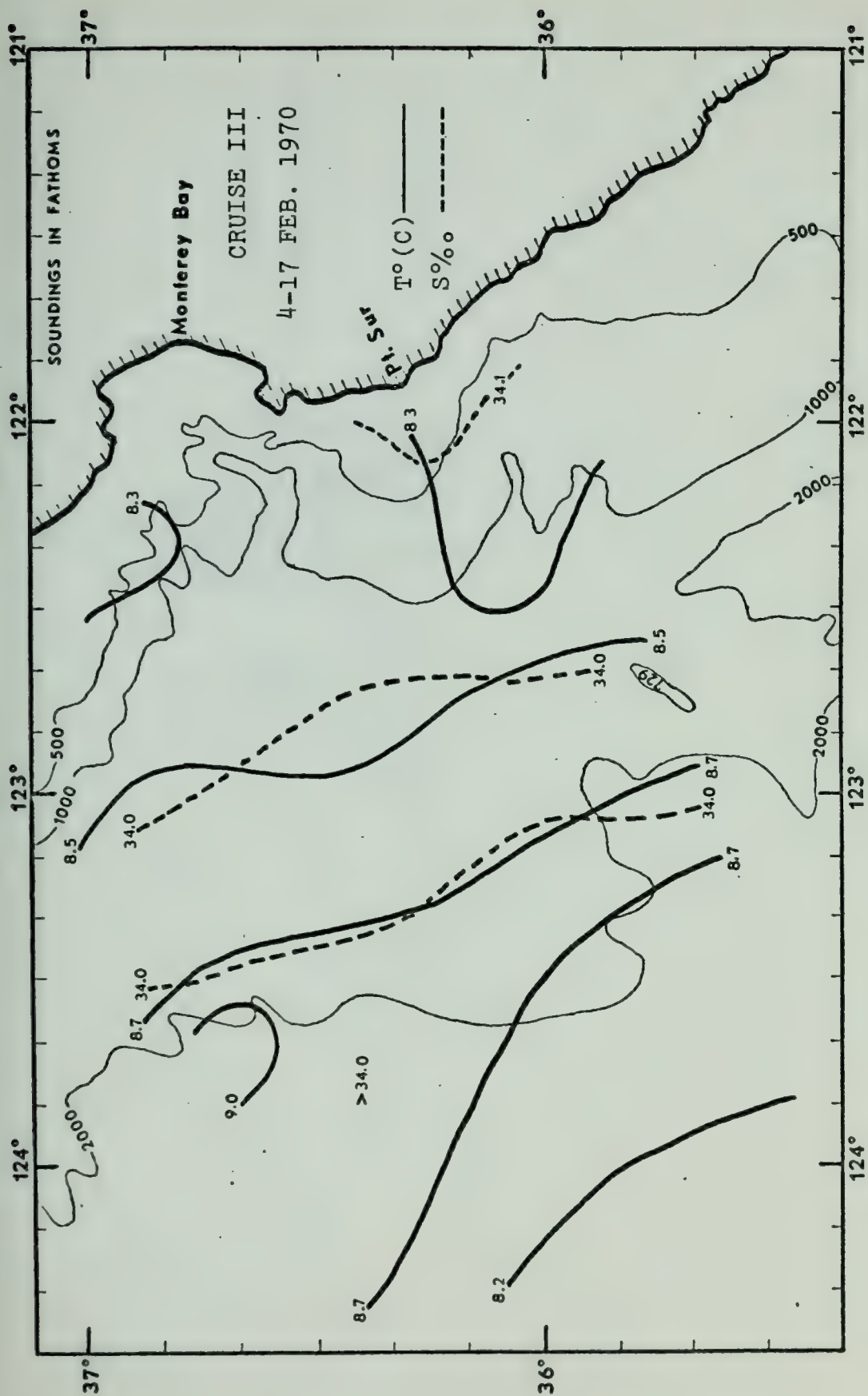


Fig. 26. Cruise III. Temperature ($^{\circ}\text{C}$) and salinity (‰) at 200 m.

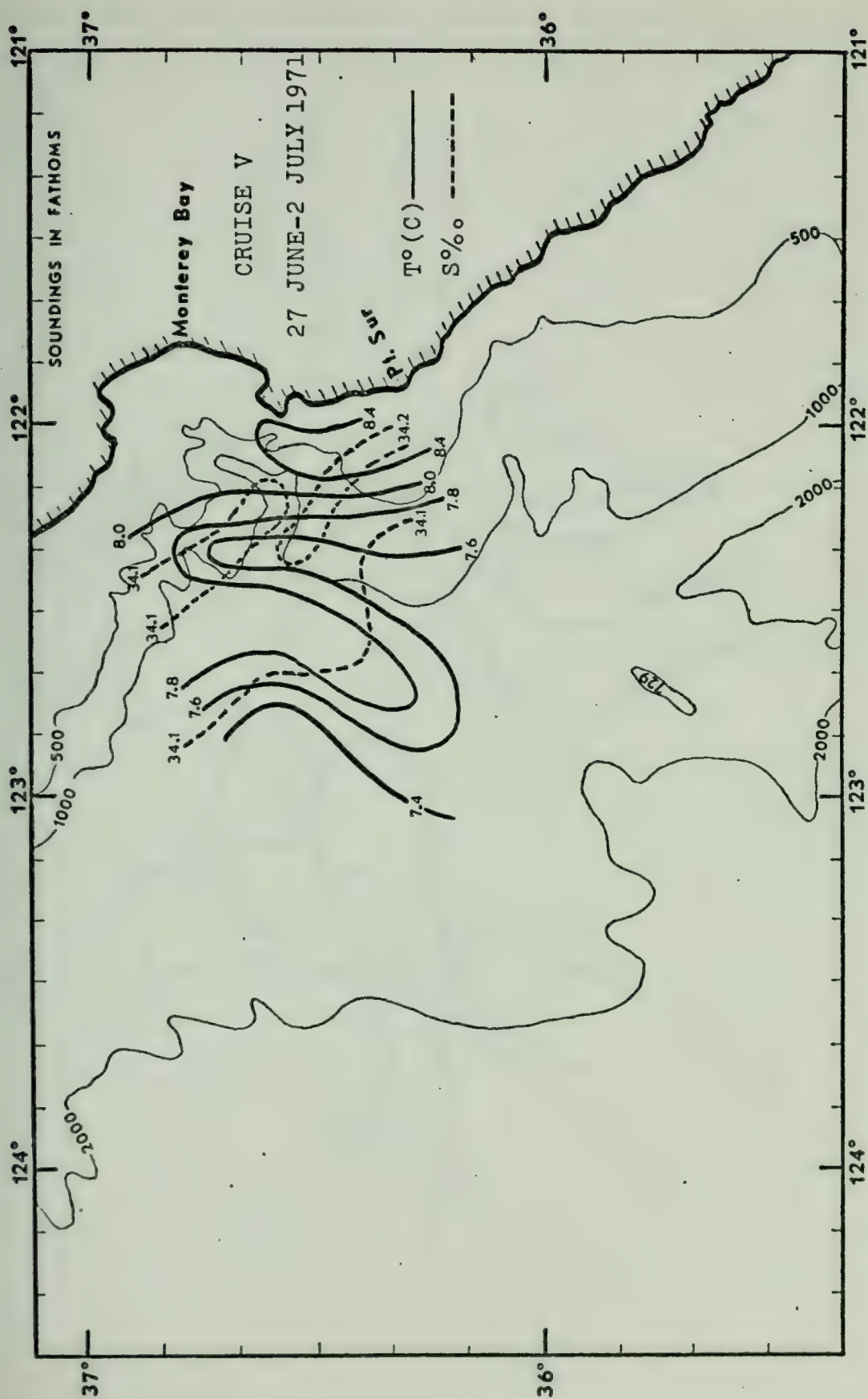


Fig. 27. Cruise V. Temperature ($^{\circ}C$) and salinity (‰) at 200 m.

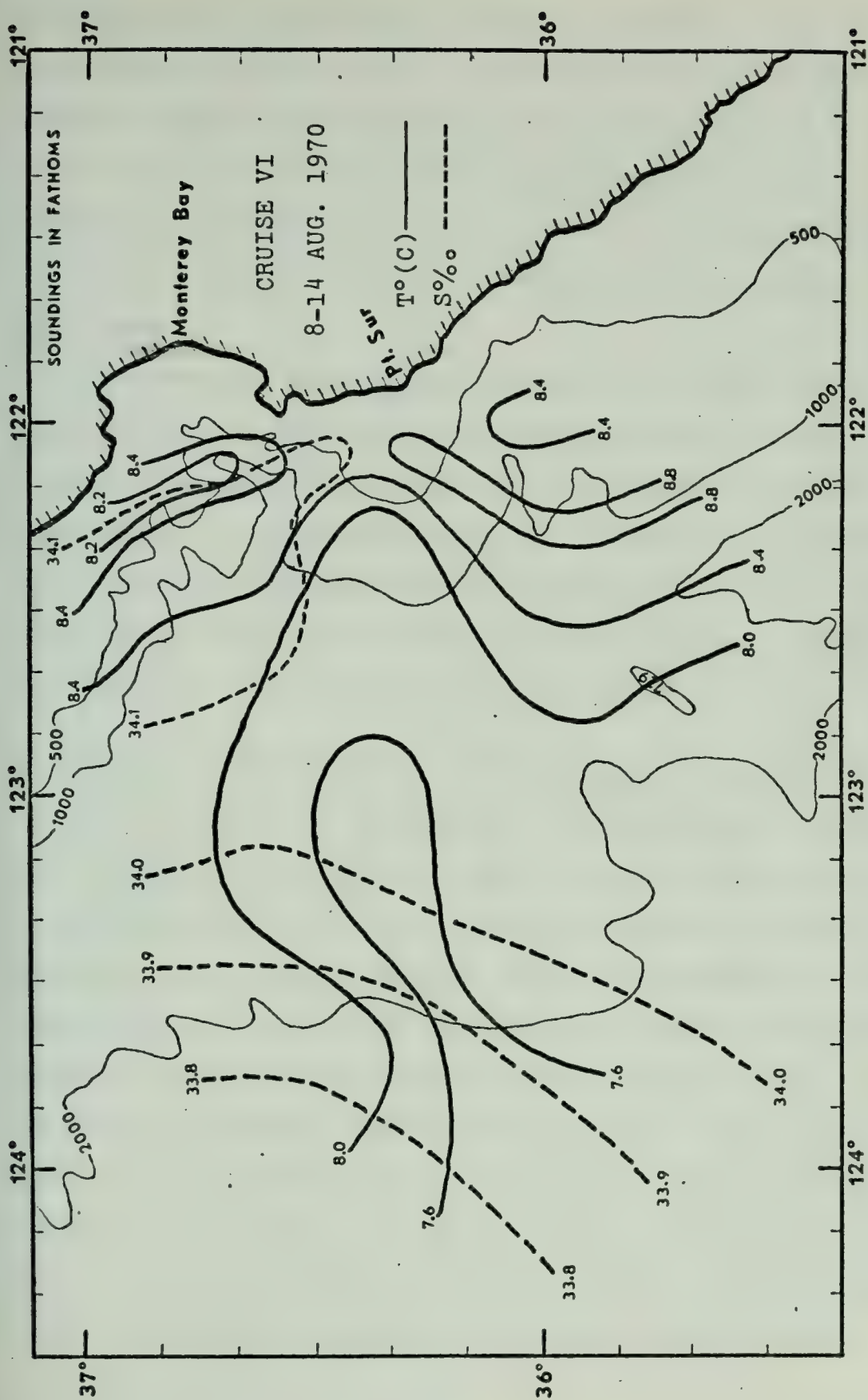


Fig. 28. Cruise VI. Temperature, ($^{\circ}C$) and salinity (‰) at 200 m.

coincides with the offshore southward current. As in the early summer months (Cruise V) the nearshore region off the northern edge of Monterey Bay was also characterized by relatively cold, high salinity water apparently due to upwelling. Also of interest is that in all three cruises the areas of upwelling were the same areas where eddies were found.

The agreement between the currents and patterns of temperature and salinity was remarkable in view of the probable non-stationarity and the time interval between observations. The agreement may be interpreted as indicating that, even with non-stationary conditions, the changes were slow and modified only the details of the general picture, especially at locations away from the shelf.

F. VERTICAL DISTRIBUTION OF TEMPERATURE AND SALINITY

The variations in the vertical distribution of temperature and salinity between the winter season (Cruise III), early summer (Cruise V) and late summer (Cruise VI) are depicted graphically in Figures 29-34. A comparison of the temperature profiles (Figs. 29, 31 and 33) shows that the thermocline extended from the surface to nearly 100 m at the stations farthest from shore during late summer, and in contrast to the winter and early summer cruises, it intensified as it approached the coast, rising to a thin surface layer of only 25 m at the nearshore stations. During all seasons the surface temperature increased with distance



Fig. 29. Cruise III (Feb. 1970). Vertical cross section of temperature ($^{\circ}\text{C}$) between the surface and 500 meters. The section runs WSW from Monterey Bay.

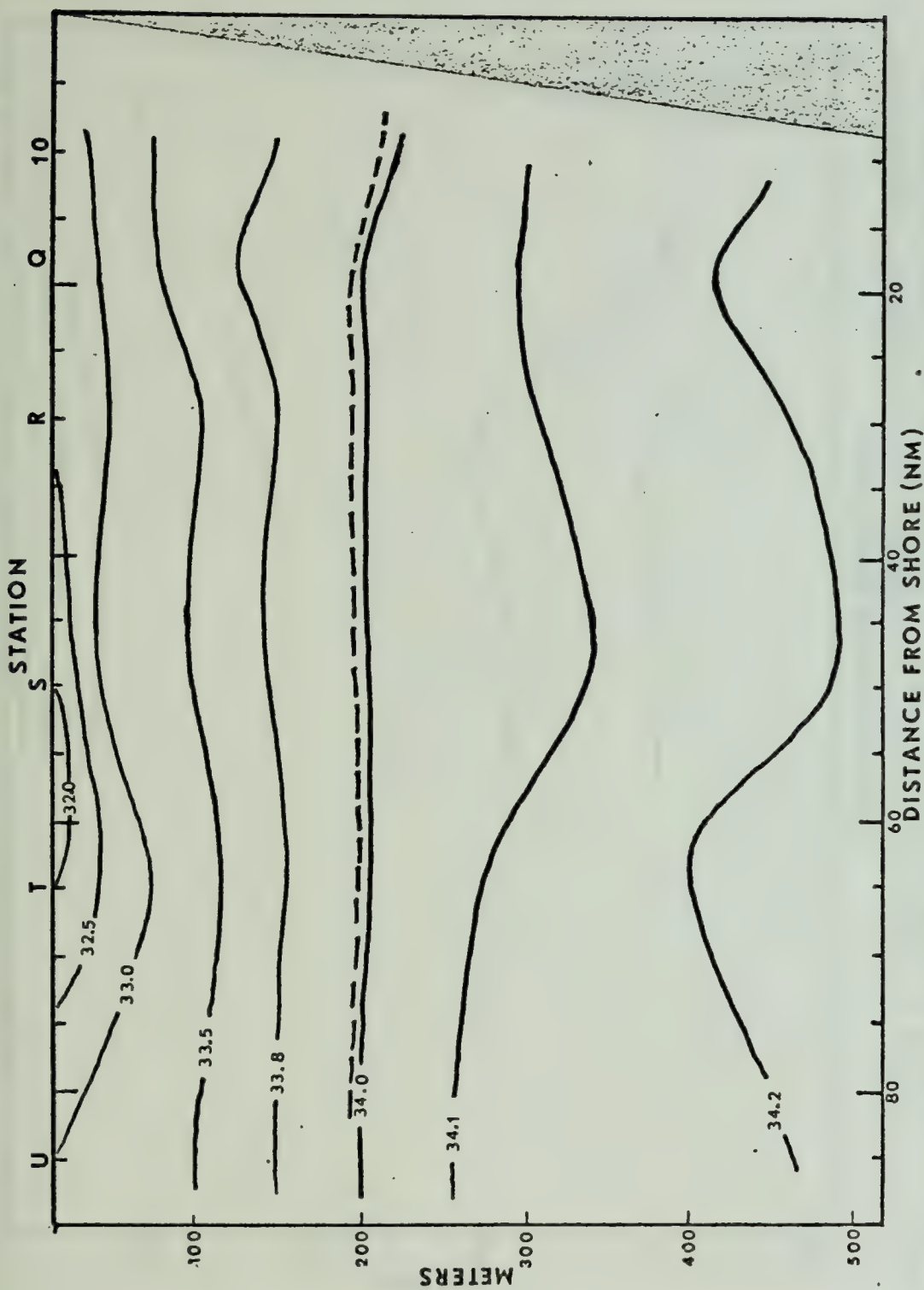


Fig. 30. Cruise III (Feb. 1970). Vertical cross section of salinity (‰) between the surface and 500 meters. The 26.4 isopycnal is represented by a dashed line. The section runs WSW from Monterey Bay.

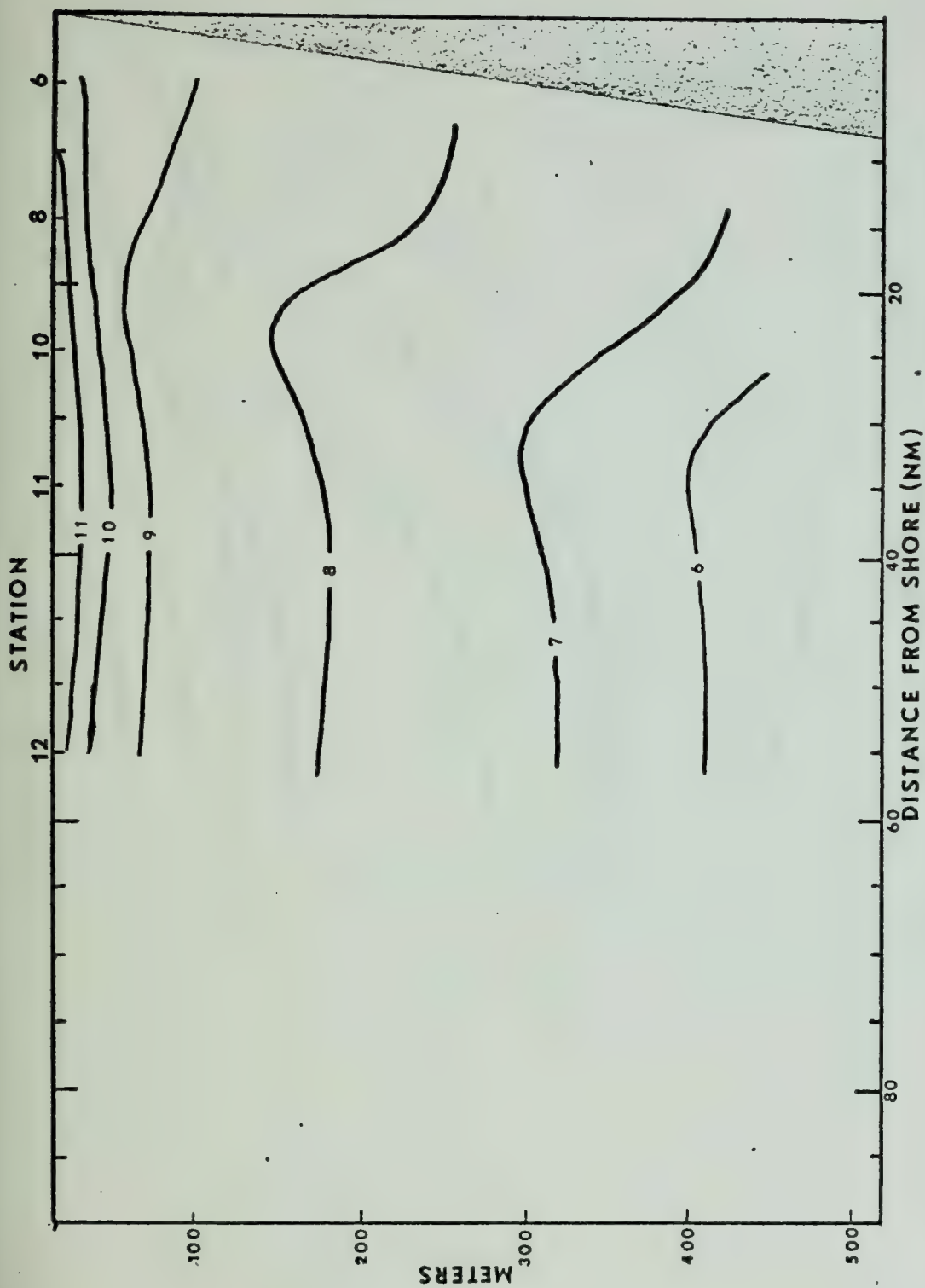


Fig. 31. Cruise V (June-July 1971). Vertical cross section of temperature ($^{\circ}\text{C}$) between the surface and 500 meters. The section runs WSW from Monterey Bay.

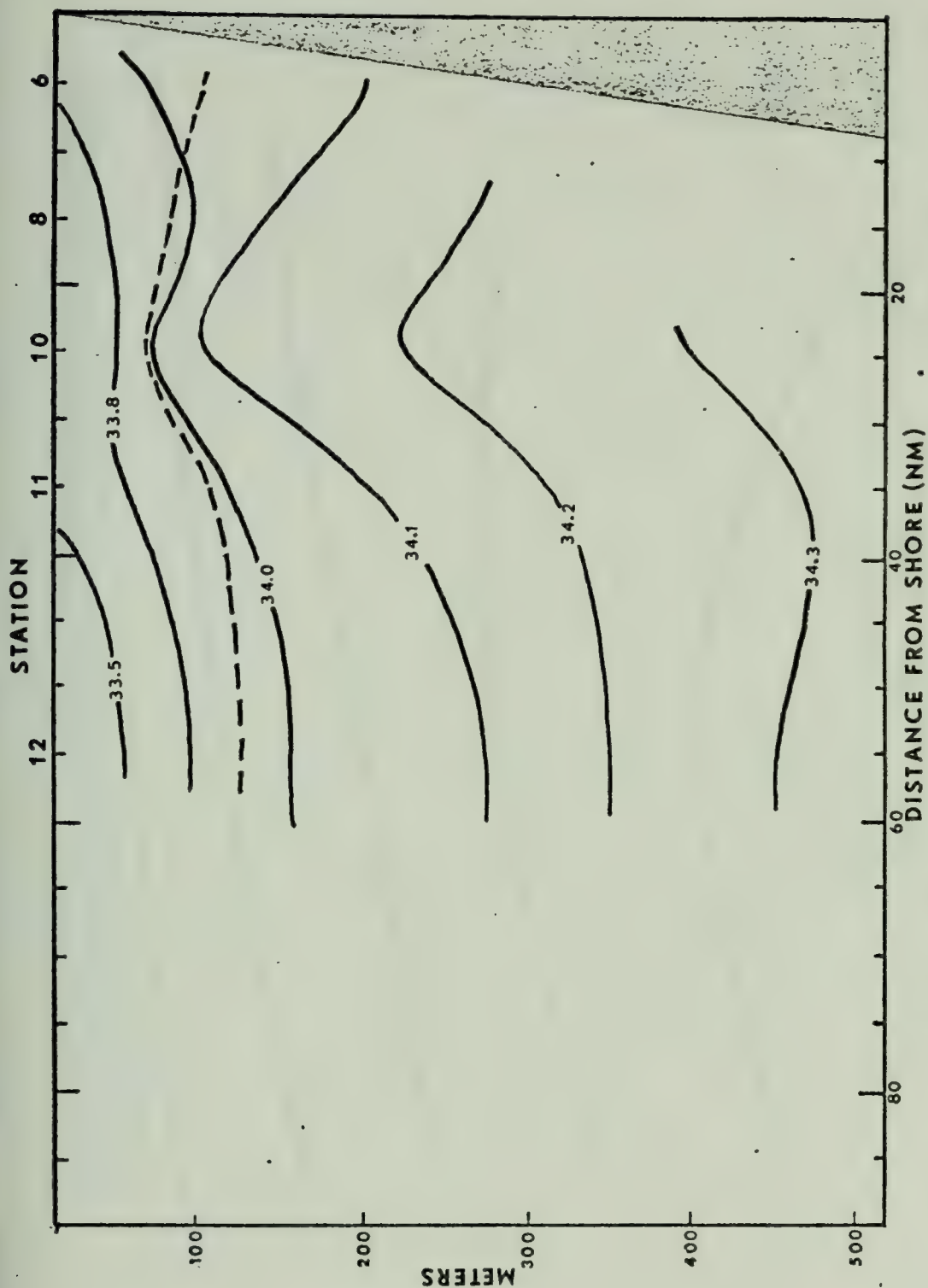


Fig. 32. Cruise V (June-July 1971). Vertical cross section of salinity (‰) between the surface and 500 meters. The 26.4 isopycnal is represented by a dashed line. The section runs WSW from Monterey Bay.



Fig. 33. Cruise VI (Aug. 1970). Vertical cross section of temperature ($^{\circ}\text{C}$) between the surface and 500 meters. The section runs WSW from Monterey Bay.

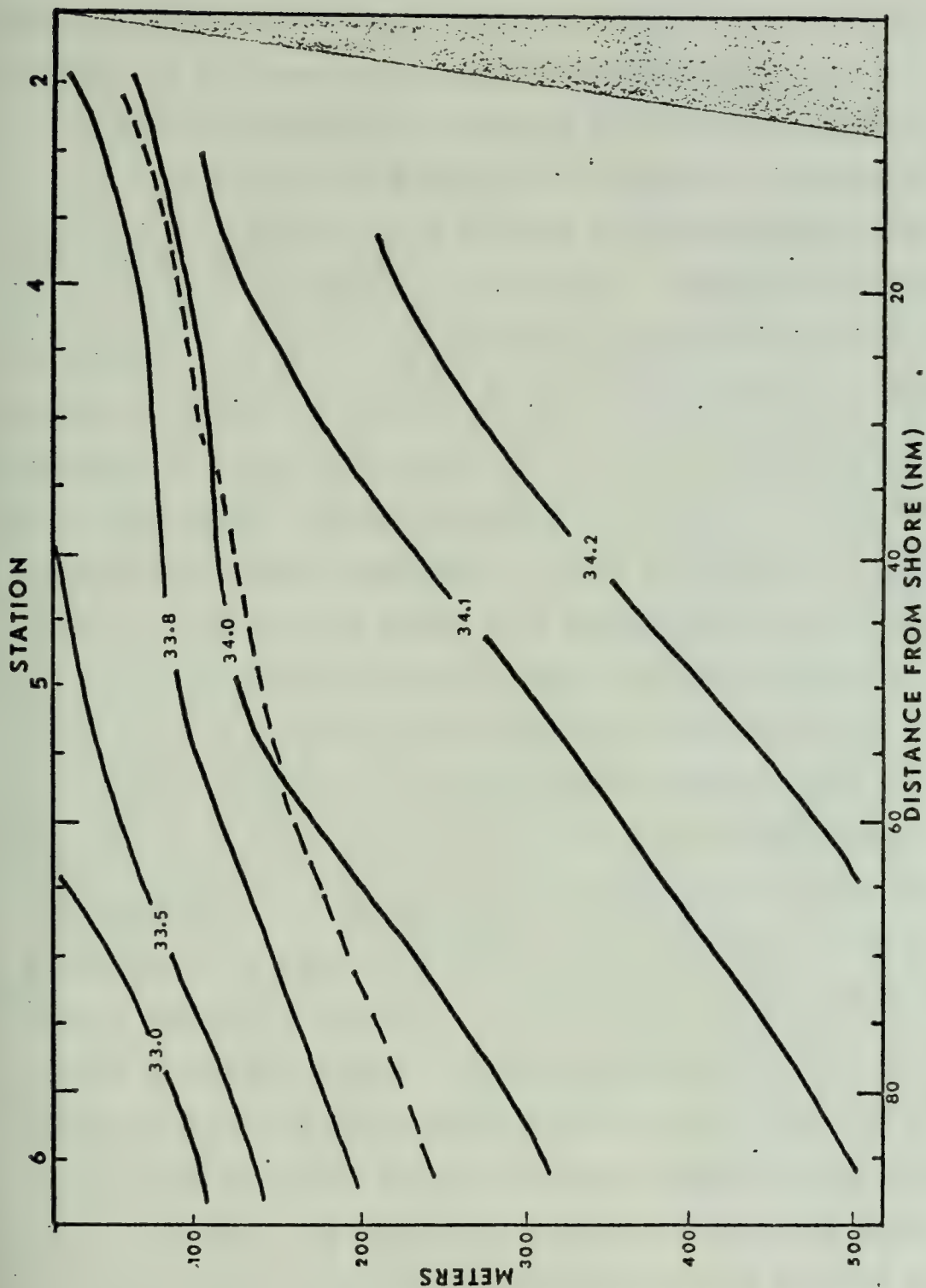


Fig. 34. Cruise VI (Aug. 1970). Vertical cross section of salinity (%) between the surface and 500 meters. The 26.4 isopycnal is represented by a dashed line. The section runs WSW from Monterey Bay.

from shore, a phenomenon which is typical of the region according to Reid (1960). In addition, the seasonal variation of the thermal structure confirms the annual cycle postulated for this region by Skogsberg (1936).

Marked variability in salinity distributions between seasons can be seen in Figures 30, 32 and 34. The most significant change between seasons can be described simply by looking at the 34.0 ‰ isohaline. Note that in winter it remains constant at approximately 200 m, whereas in late summer it rises rapidly from a depth of 300 m at the farthest offshore station, to a depth of about 60 m approximately 5 nm from shore. In early summer it, as well as the deeper isohalines, rises significantly in an area about 25 nm offshore. As will be shown in a later section concerning distribution of water masses, this rise was apparently due to an intense intrusion of Equatorial Pacific water.

The 26.4 isopycnal is illustrated (dashed line) on Figures 30, 32 and 34 to show the results of the above distributions. It is nearly horizontal and constant at about 200 m in winter. However, in late summer it rises from a depth of more than 240 m offshore to less than 75 m at the nearshore station. Comparing Figures 25, 28 and 34 confirms the previous speculation that late seasonal upwelling has occurred in the nearshore region during the late summer of 1970. It should be noted that the time frame during which the upwelling actually occurred is very difficult to define. It can only be concluded that either

upwelling was actively occurring during the time of the cruise, or the water was from a previous upwelling event which had been horizontally advected into the area.

G. MIXING OF WATER MASSES BETWEEN 100 AND 1000 METERS

As previously discussed in Section II, two water masses are typically found in the California region, a northern (Subarctic) water mass and a southern (Equatorial Pacific) water mass. These water masses are not characterized by a single point on a T-S diagram, but rather by T-S curves. In any consideration of the mixing of water masses characterized by T-S curves certain assumptions concerning the character of the mixing must be made (Sverdrup and Fleming, 1941). The assumptions made for this study were that the observed distribution of temperature and salinity in the area of transition is maintained by essentially horizontal advection and by lateral mixing of waters having the T-S relationships defined in Figure 3, and that mixing takes place primarily along surfaces of equal σ_t . On the basis of these assumptions a diagram similar to that used by Tibby (1941) was constructed (Figure 35). The area between the two T-S curves, defining the Subarctic and the Equatorial Pacific water masses, has been divided into proportioned parts, and new T-S curves have been constructed which correspond to mixtures of Subarctic water containing 10 to 90 per cent of Equatorial Pacific water. By means of this diagram the percentage of Equatorial Pacific water which

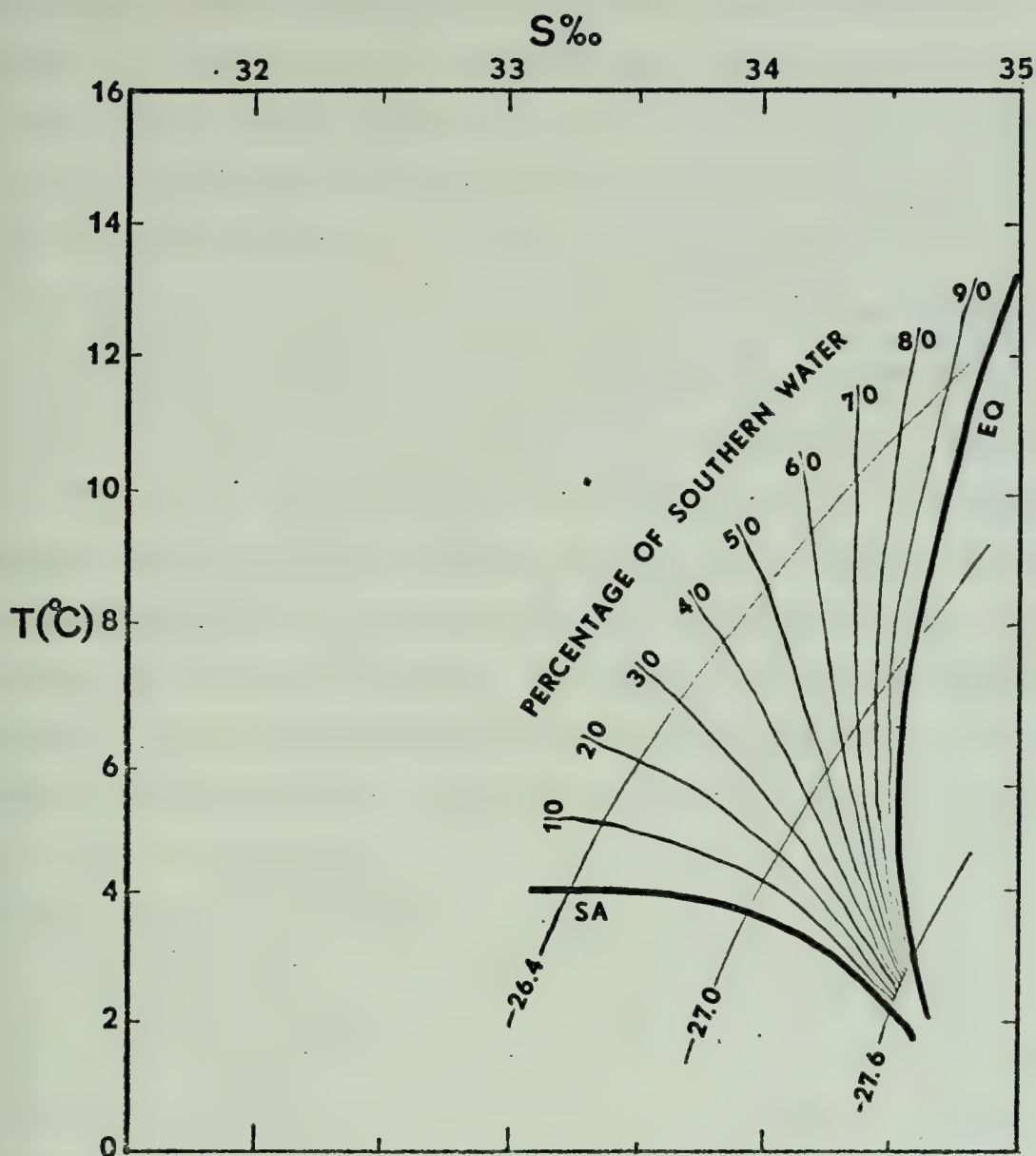


Fig. 35. Graph showing T-S curves defining Subarctic water and Equatorial Pacific water, and curves for various percentages of Equatorial Pacific water assuming mixing along surfaces of equal σ_t .

corresponds to any given temperature and salinity within the entire area examined can be charted and studied. It should be noted that the determination of percentage composition by this means cannot be used for water above about 100 m, since near the surface, non-conservative processes are prominent and mixing along σ_t surfaces will be masked (Tibby, 1941). Below a depth of about 1000 m the differences in T-S relationships of the two extreme water masses are so small that application of the method is uncertain. Figures 36, 37 and 38, which are T-S diagrams typical of the winter season, early and late summer, respectively, point out these facts graphically. Note that on the diagrams symbols are placed at the 100, 200, 300, 400, 500, 600, 800 and 1000 m levels. The two curves in Figure 38 illustrate the maximum and minimum T-S values found below 100 m during all three seasons. Only Station 10 on Cruise V (early summer) had values outside the range established by the two curves.

Figures 39, 40 and 41 are vertical sections showing the percentage of Pacific Equatorial water for the winter season, early and late summer, respectively. One feature of the distribution is common to all seasons: the percentage is higher towards the bottom and towards the shore. This feature was found to generally hold true for all six cruises and agrees with the results obtained by Tibby (1941). As can be seen in Figure 42, his results differ from those obtained in this study in that he found a smaller percentage of Equatorial Pacific water in the area. Figure 42 shows

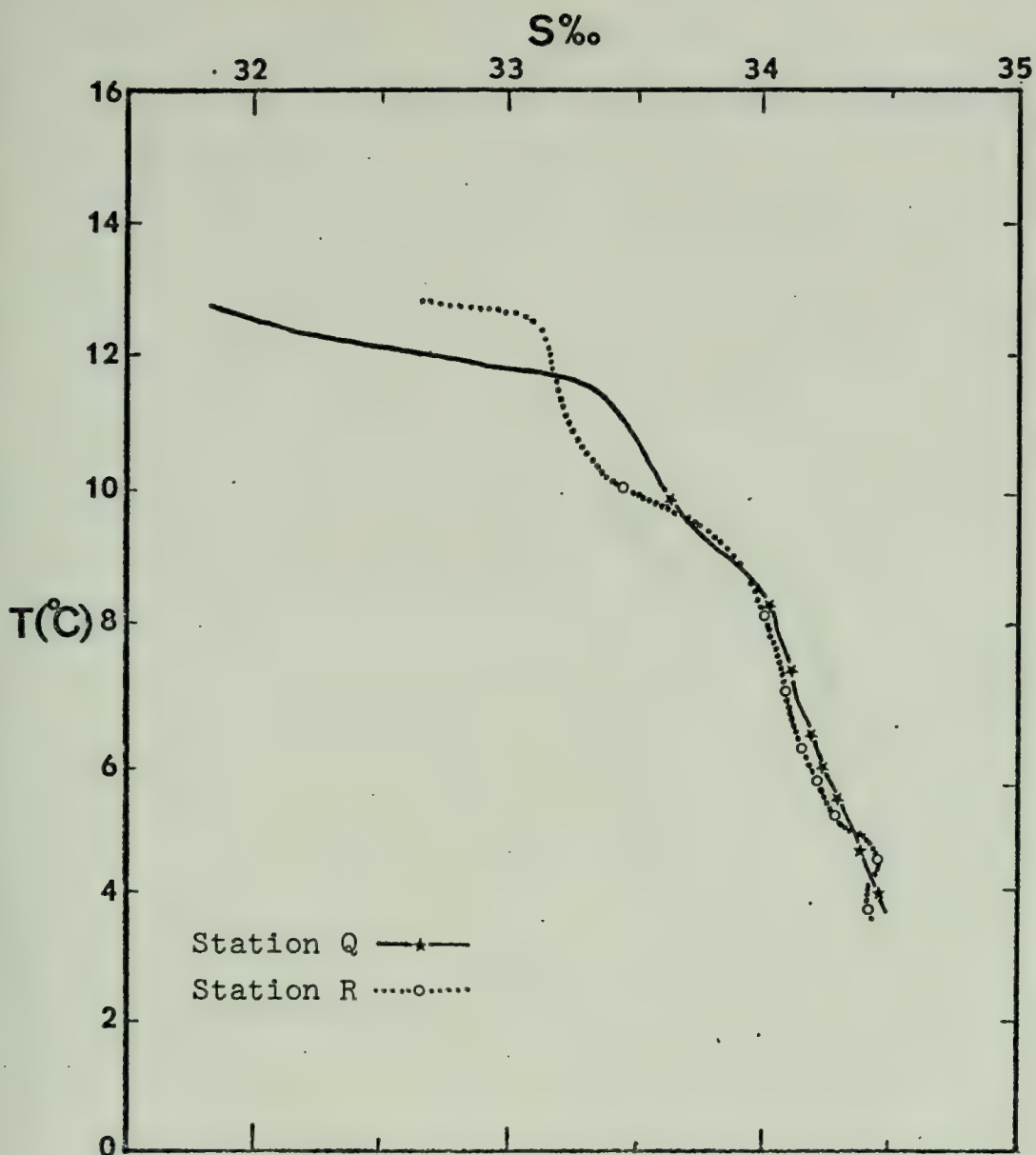


Fig. 36. Cruise III (Feb. 1970). T-S curves from the surface to 1000 m for stations Q and R. Symbols indicate selected depths (see text).

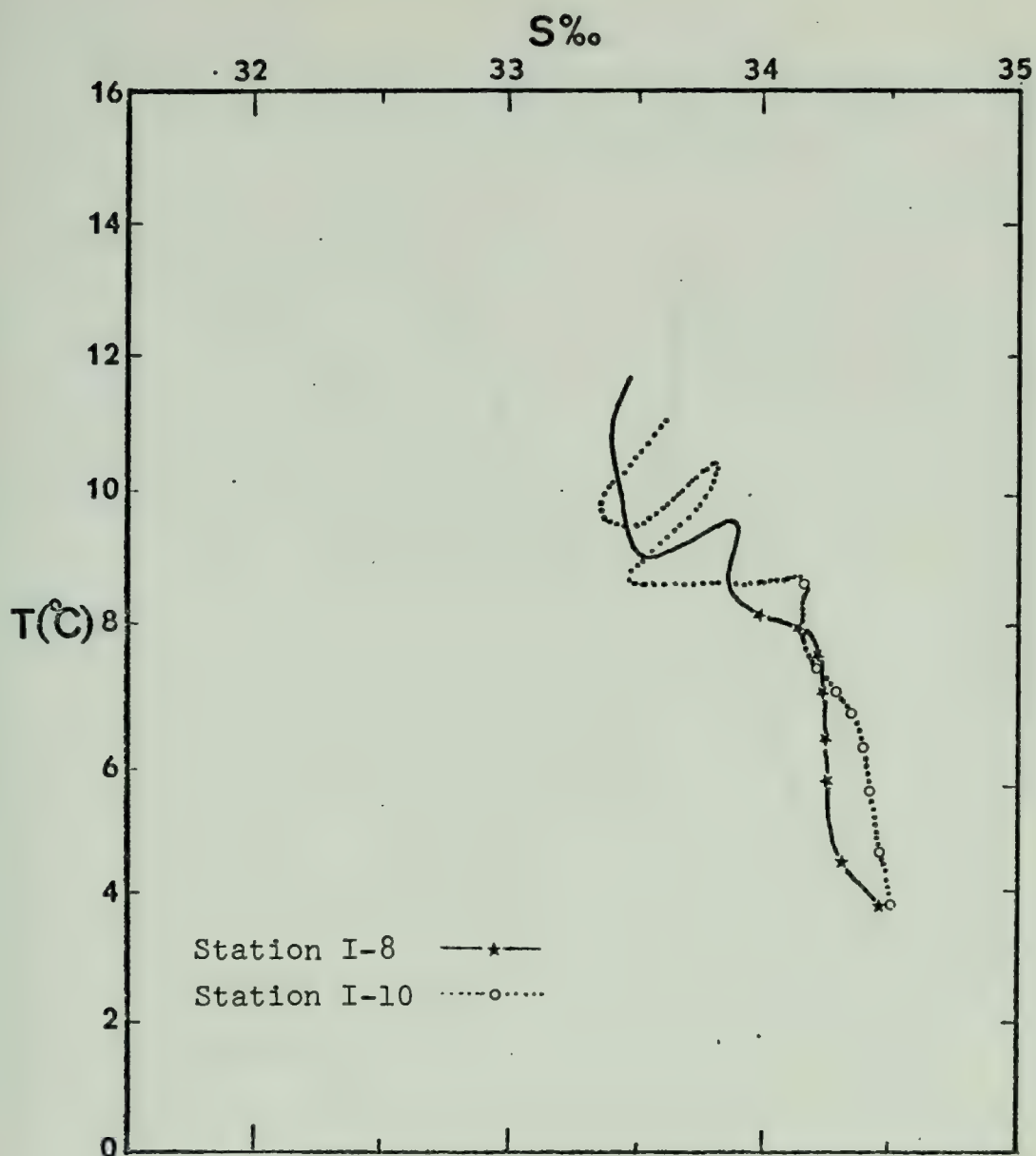


Fig. 37. Cruise V (June-July 1971). T-S curves from the surface to 1000 m for Stations I-8 and I-10. Symbols indicate selected depths (see text).

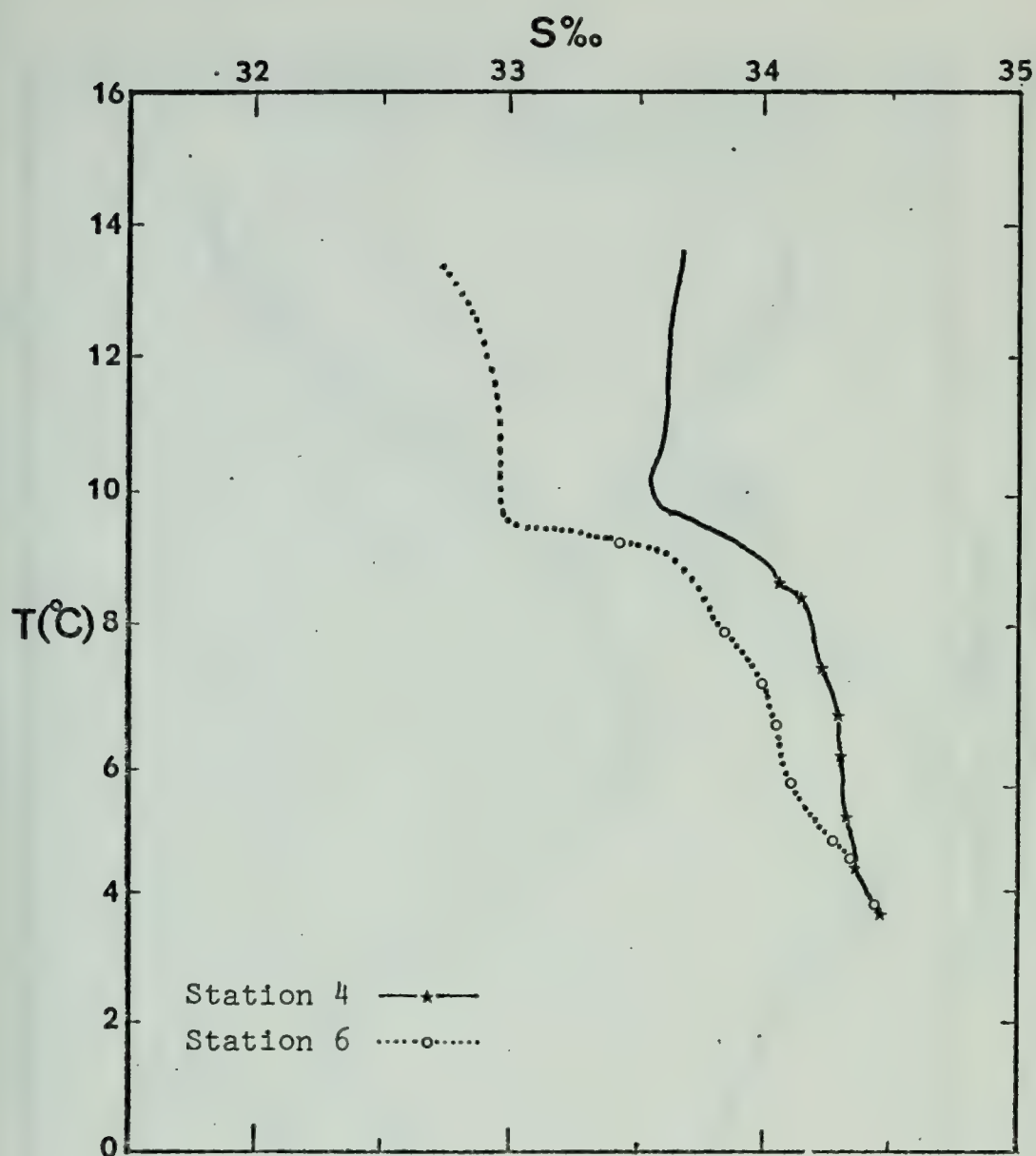


Fig. 38. Cruise VI (Aug. 1970). T-S curves from the surface to 1000 m for Stations 4 and 6. Symbols indicate selected depths (see text).

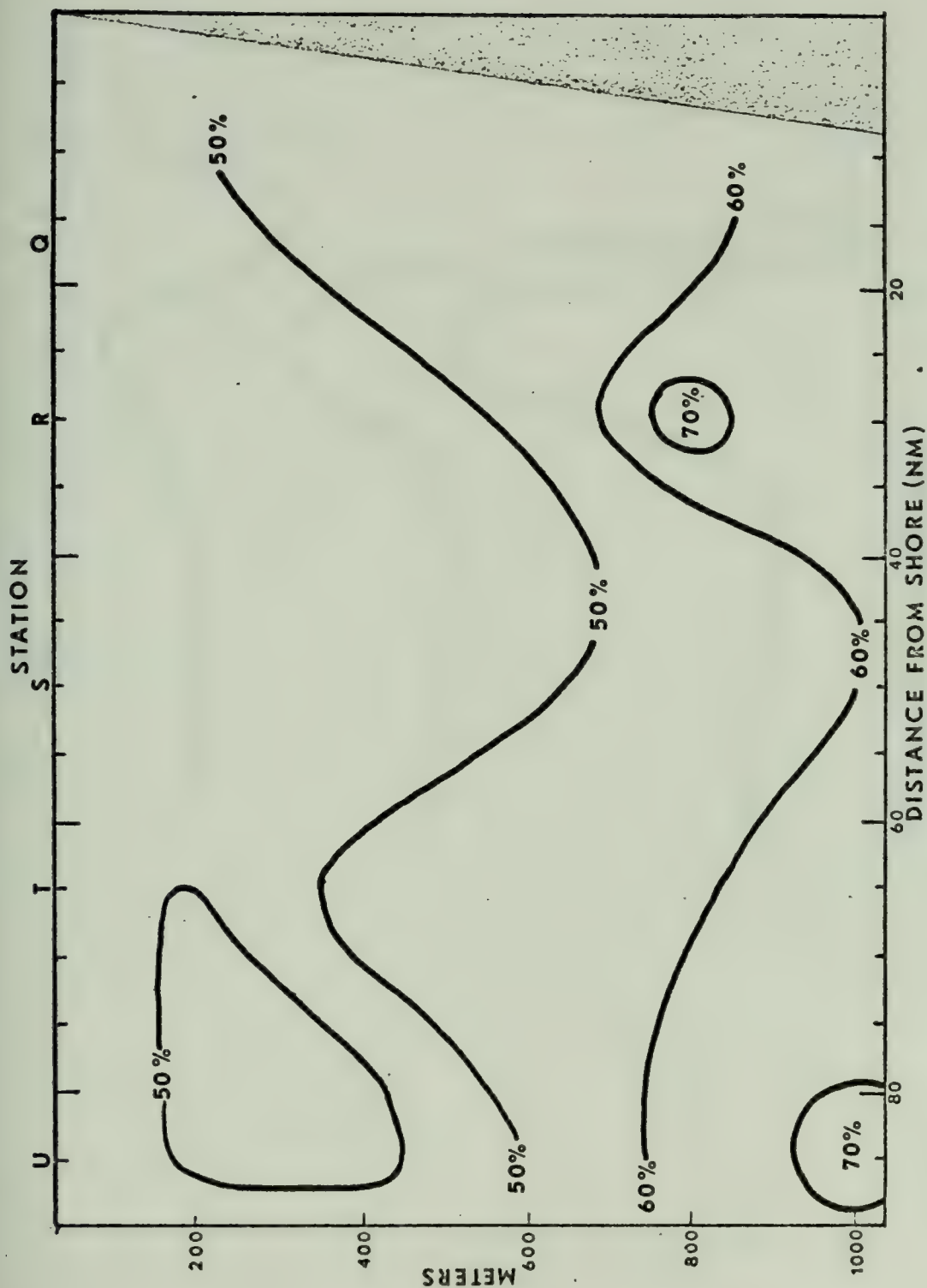


Fig. 39. Cruise III (Feb. 1970). Vertical cross section showing percentage of Equatorial Pacific water. The section runs WSW from Monterey Bay.

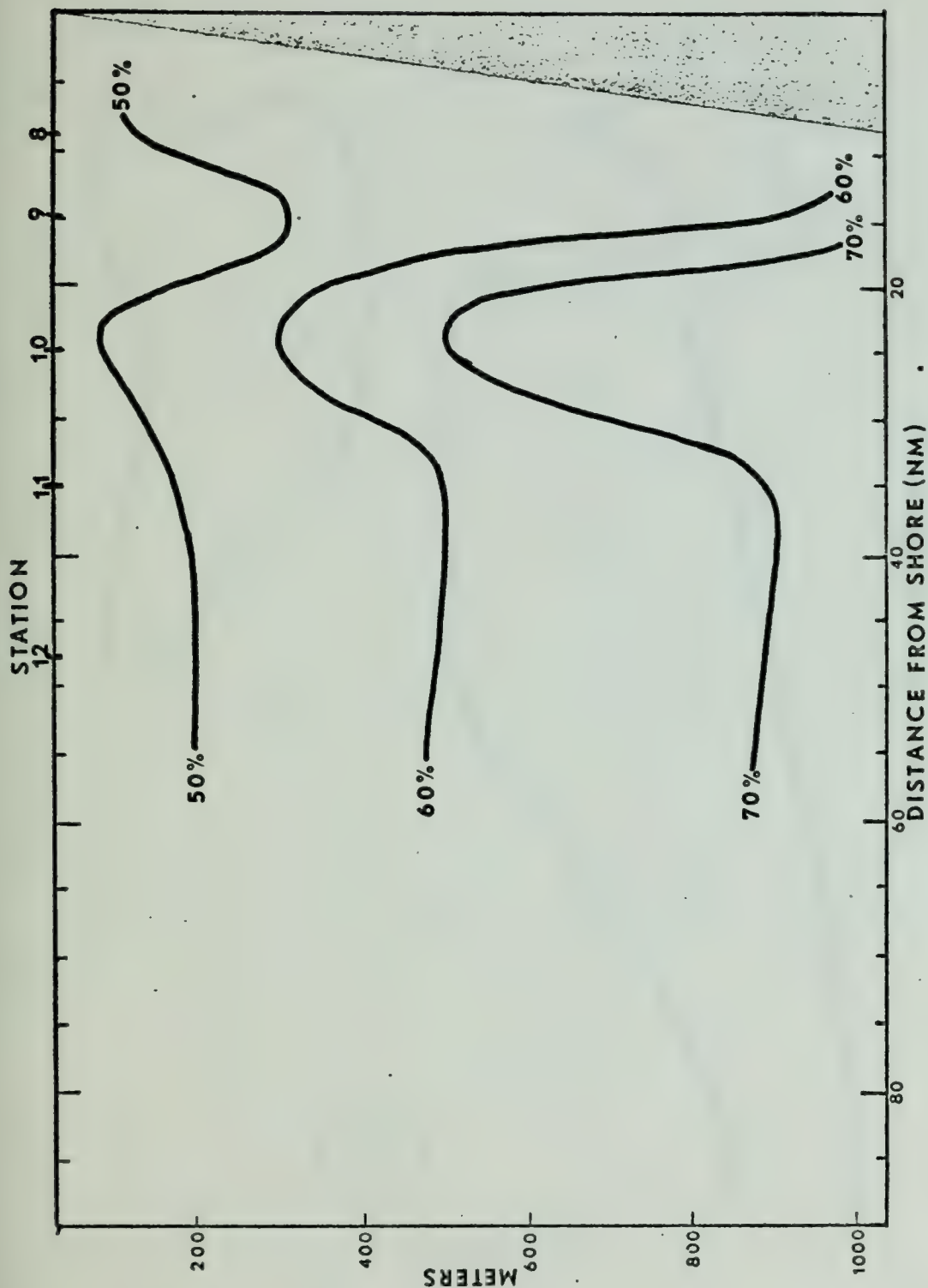


Fig. 40. Cruise V (June-July 1971). Vertical cross section showing percentage of Equatorial Pacific water. The section runs WSW from Monterey Bay.

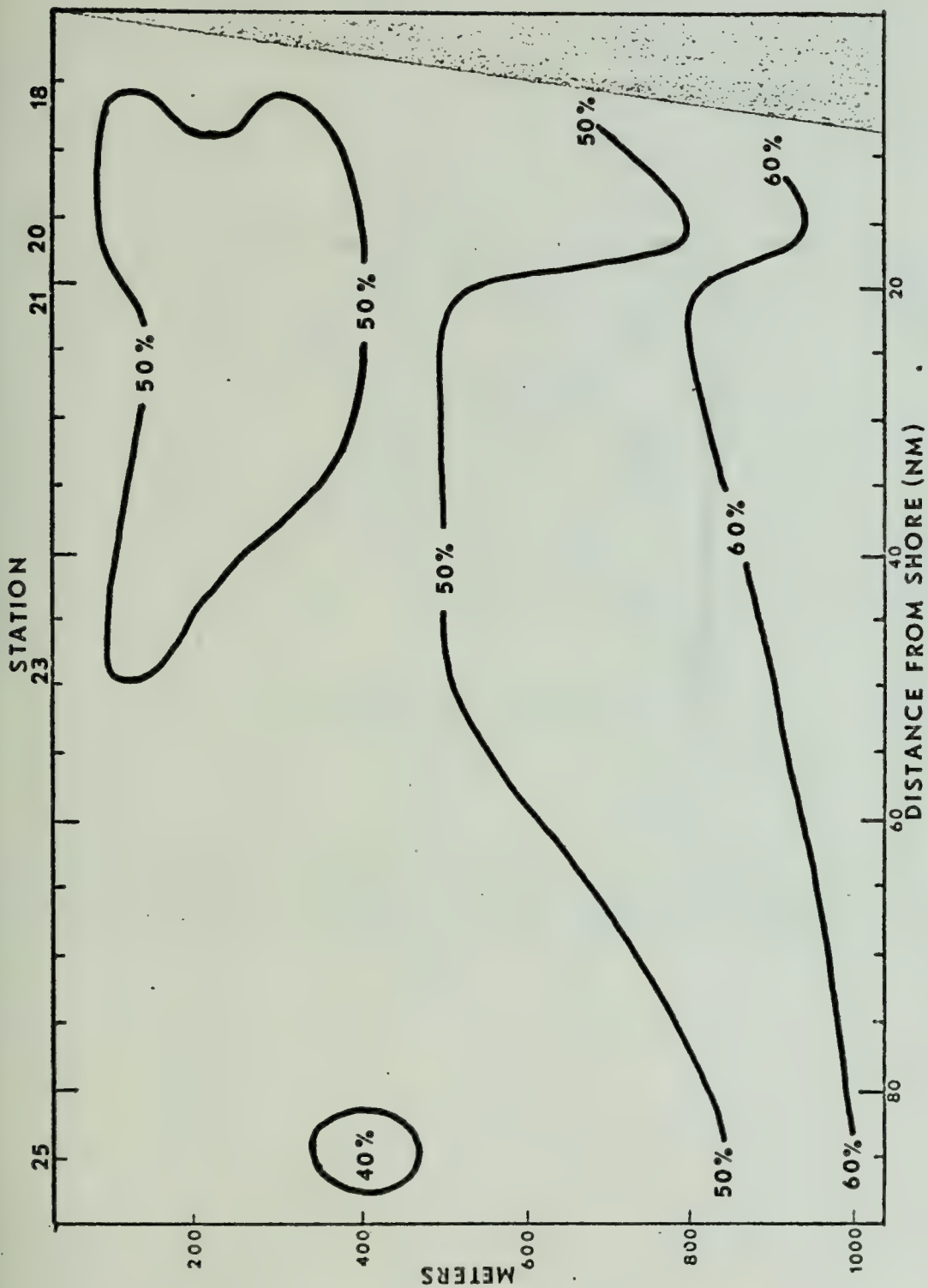


Fig. 41. Cruise VI (Aug. 1971). Vertical cross section showing percentage of Equatorial Pacific water. The section runs WSW from Monterey Bay.

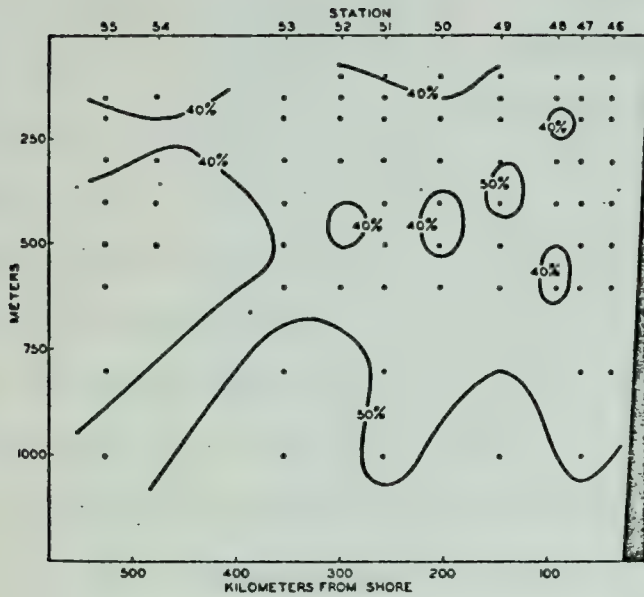


Fig. 42. Section 3 off Monterey, California, showing percentage of Equatorial water (from Tibby, 1941).

that he found a maximum of 50 per cent Equatorial Pacific water in the area, whereas greater than 60 per cent Equatorial Pacific water was found on all six cruises examined in this study.

Figure 40 shows a significant southern water intrusion of considerable vertical extent near Station 10. When compared to Figures 21, 27 and 32, it confirms the earlier assertion that the distribution of properties in this area were due to the intensity of the Equatorial Pacific intrusion.

Figures 43 and 44, in addition to Figure 41, show the latitudinal variability of percentage composition of Equatorial Pacific water found in late summer (Cruise VI). Figure 43 shows the northernmost line while Figure 44 shows a transect about 60 nm to the south. A comparison of these two figures with the flow at the surface and at 200 m (see Figs. 16 and 22) shows very good agreement. The offshore stations having the low percentage of Equatorial Pacific water are being fed by the California Current carrying Subarctic water. The nearshore stations lie in the path of the Davidson Current, thus giving rise to a greater percentage of Equatorial Pacific water.

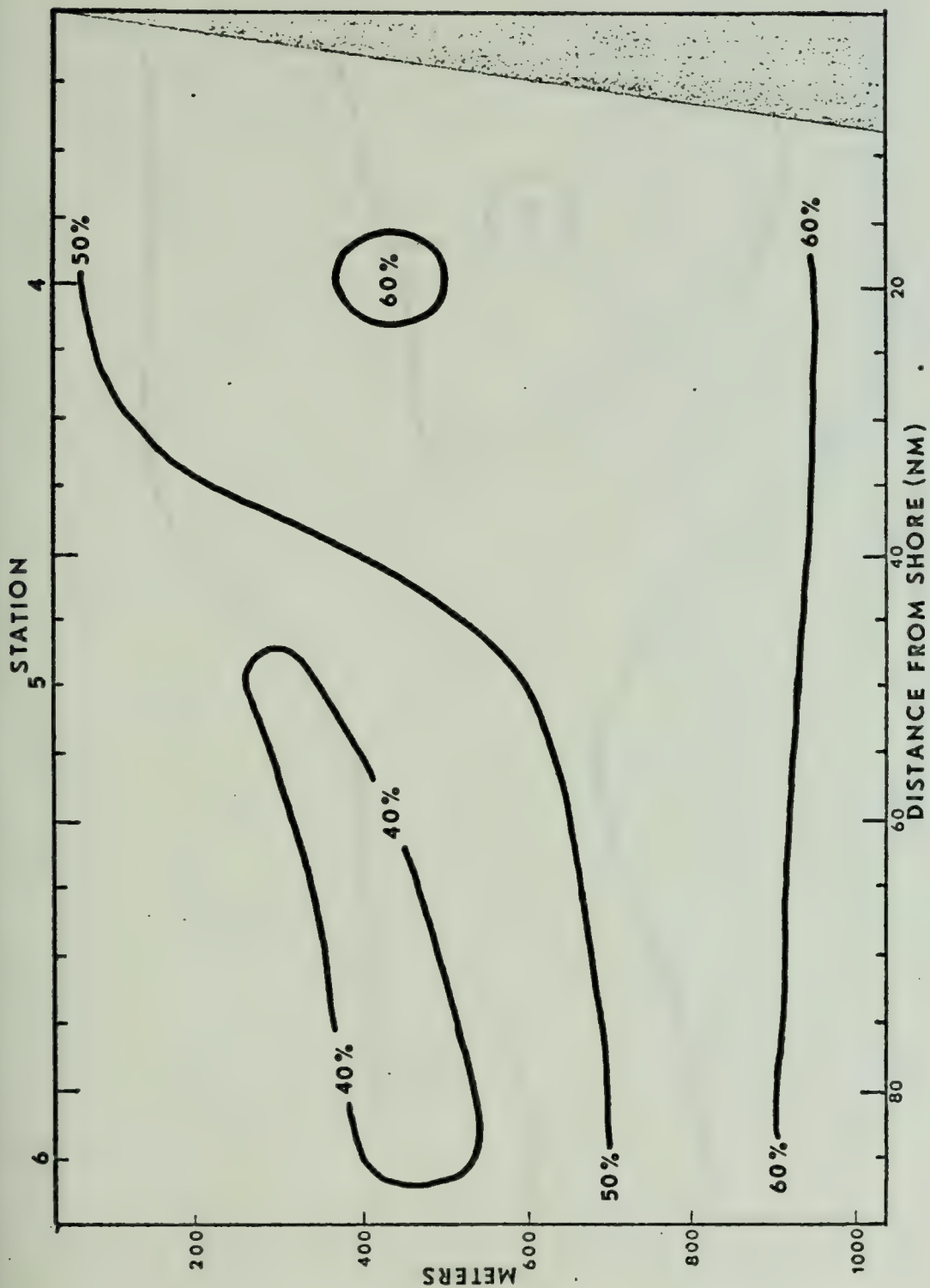


Fig. 43. Cruise VI. (Aug. 1970). Vertical cross section showing percentage of Equatorial Pacific water. The section runs WSW from Ano Nuevo Island.

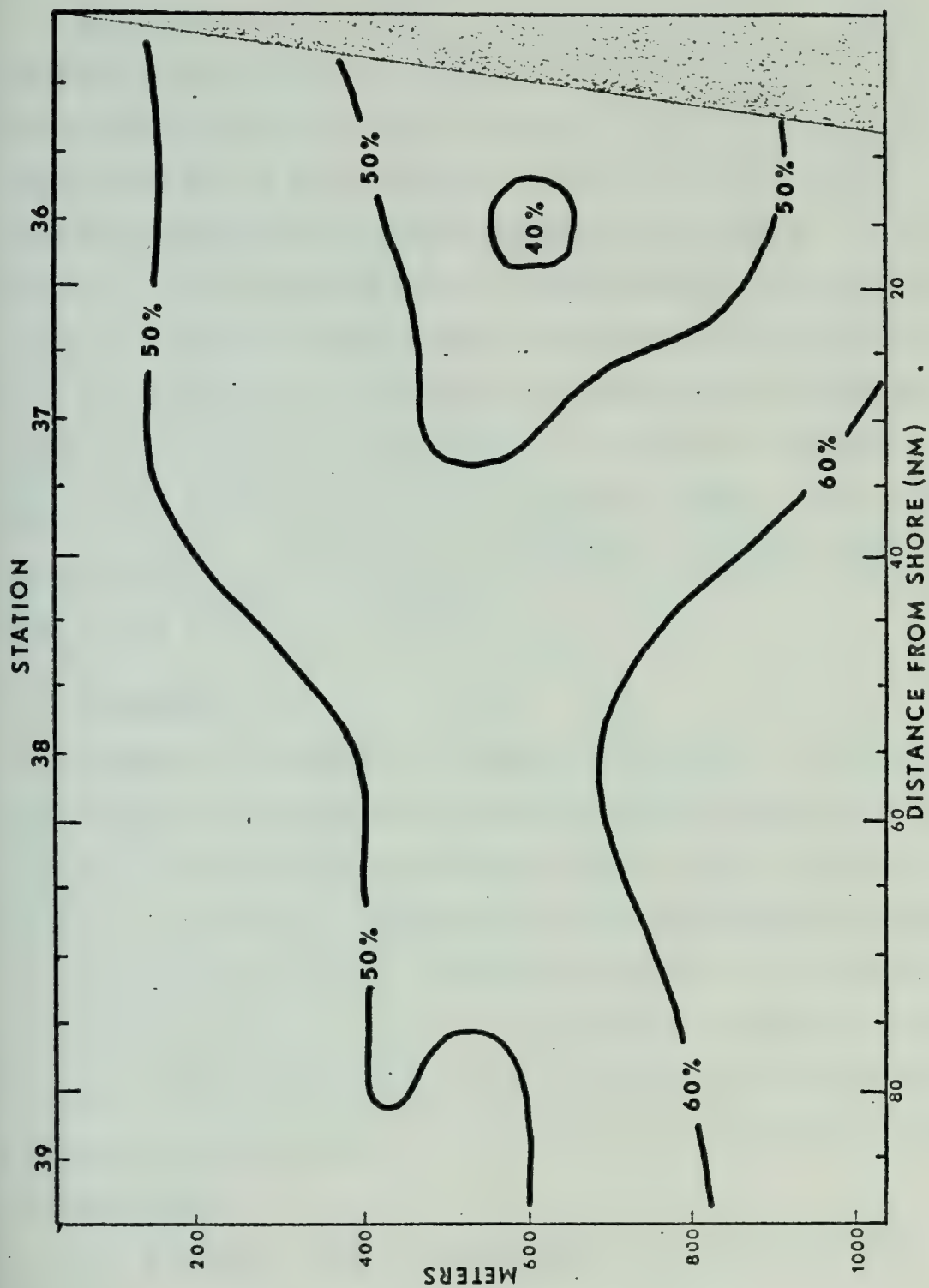


Fig. 44. Cruise VI (Aug. 1970). Vertical cross section showing percentage of Equatorial Pacific water. The section runs WSW from Pt. Sur.

VI. SUMMARY AND CONCLUSIONS

The oceanic region off the Central California coast between Cape Mendocino and Pt. Conception has received relatively little attention in the literature since the early 1940's. A knowledge of the physical oceanography of this region is of vital importance to commercial enterprises in the area and to new projects such as the construction of a nuclear power plant near Davenport, California.

This study has attempted to describe the seasonal variations in currents, temperature and salinity, and water masses in a portion of this unexplored region. The data discussed were obtained on six cruises covering a span of two years from 1970 to 1972.

A. CURRENTS

Computations based on density distribution show that the surface currents are subject to marked seasonal variability. The area studied is generally characterized by small scale eddies, especially during the upwelling season, and by the interlacing of separate bands of poleward and equatorward flow. Assuming conservation of vorticity is valid in this region, it can be concluded that the bottom topography influences the direction of flow inside the 1000 fathom curve.

At a depth of 200 m the currents are very similar to those found at the surface.

B. TEMPERATURE AND SALINITY

Skogsberg's (1936) annual cycle, composed of three distinct hydrographic seasons, was generally adhered to during the two year span that this study covered. The results confirm the existence of a winter and upwelling season. Although the existence of a distinct oceanic season could not be confirmed due to a paucity of data, the results of the late summer cruise (Cruise VI, August 1970) clearly show a transition towards the conditions characteristic of an oceanic season.

C. MIXING OF WATER MASSES

The area studied lies virtually in the middle of the transition zone between Subarctic and Equatorial Pacific waters. As a consequence, the mixing of these two extreme water masses is nearly complete. Thus only subtle changes from season to season are noted, with the highest percentage of Equatorial Pacific water being found, in general, during winter and early summer. The results of this study confirm Tibby's (1941) results in that the percentage composition of southern water increases with depth and towards shore. Greater than 60 per cent Equatorial Pacific water is found throughout the year below 800 m.

APPENDIX A

"HYDRO"

A Computer Program for Processing Hydrographic Data

A. INTRODUCTION

This discussion is presented in order to familiarize the reader with a computer program that will interpolate salinity and temperature data for "standard depths" and calculate density (σ_t), specific volume, specific volume anomaly, sound velocity, dynamic height, dynamic height anomaly, and geostrophic currents and transports. The theoretical development of the appropriate equations may be found in Sverdrup, Johnson, and Fleming, The Oceans, or in Neumann and Pierson, Principles of Physical Oceanography. The application of these equations is embodied in the text of the program.

B. PREPARATION OF THE DATA DECK

The data deck consists of three main parts:

- (a) number of geostrophic current calculations to be performed
- (b) designation of pairs of stations between which geostrophic currents and transports are to be computed
- (c) station data.

These parts are discussed individually in more detail assuming the user has a fundamental knowledge of computer programming in the Fortran language.

(a) Number of Geostrophic Calculations (termed NGC) refers to the number of pairs of stations between which user wishes to have geostrophic calculations made. This two digit integer is punched in columns 3 and 4 on the first data card as indicated below. If no geostrophic calculations are desired, the first data card should have zeros (or blanks) in columns 3 and 4; and the user should skip to part (c), preparation of station data.

<u>Column</u>	<u>Format</u>	<u>Item</u>
1-2	2X	blank
3-4	I2	NGC (maximum value is 48)

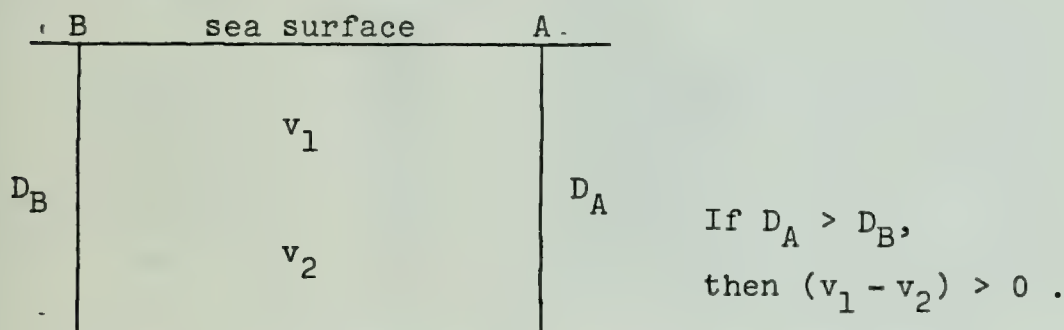
(b) If NGC was not set equal to zero, the next card(s) must specify NGC pairs of stations and the accompanying reference levels for the geostrophic currents.

At this point the user will find it helpful to plot his hydrographic stations on a chart of some sort. This chart should be sufficient to illustrate spatial relationships between stations. The user should also determine from the chart the sequence in which the stations will appear in the data deck.

It is helpful to think of the hydrographic data as being stored in a two dimensional array. The station appearing first in the data deck is stored in column 1, the second station in column 2, and so on. Within each column the temperature, salinity, and oxygen data are stored according to depth. The specification of a pair of stations,

station A and station B, is made using these column index numbers. These are the sequence numbers determined from the station plot.

The signs of the calculated relative and absolute velocities should be interpreted according to the following convention. If station A is chosen to be to the right of station B, and the dynamic height at station A is greater than the dynamic height at station B, then the relative velocity is positive directed away from the observer. That is, the quantity $(v_1 - v_2)$ is greater than zero, where v_1 refers to a surface current and v_2 refers to a deeper current as shown in the figure.



(Note: If it can be assumed that the current is dominated by a north-south component, then station A should be chosen so that it is east of station B. If it can be assumed that the current is dominated by an east-west component, then station A should be chosen so that it is south of station B. This technique will assure that the calculated currents possess signs according to the generally accepted convention: v positive northward and u positive eastward.)

The reference level must be one of the standard depths defined in the program: 0, 10, 20, 30, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500, 600, 700, 800, 1000, 1200, 1400, 1600, 2000, 2500, or 3000 meters. (These depths can be redefined if a particular situation requires it, simply substitute the appropriate card.) If the user specifies a reference level deeper than the data for the two stations, the program will automatically use the deepest level common to both stations.

The format for the second part of the data deck is as follows:

<u>Column</u>	<u>Format</u>	<u>Item</u>
1	1X	blank
2-3	I2	station A
4-5	I2	station B
6-10	F5.0	reference level
11	1X	blank
12-13	I2	station A
14-15	I2	station B
16-20	F5.0	reference level

... and so on until NGC pairs of stations have been specified. Recall that data cards are read from column 1 through 80.

(c) The data for each station is then presented as follows:

1. A heading card that indicates the number of measurements (NOV) of temperature, salinity, and oxygen taken at the station, the station name (for the user's convenience only), latitude,

longitude, and the date/time group. It would be helpful to suffix the station name with the sequence index number if it is known at the time the data deck is prepared.

11. NOV data cards that list temperature, salinity, and oxygen values as a function of increasing observed depth. Depth values here are specified as positive quantities. Oxygen values are not used in any program calculations and may be left blank on the data cards.

Heading card:

<u>Column</u>	<u>Format</u>	<u>Item</u>
1-4	I4	NOV (maximum value is 50)
5-16	3A4	station name
17-19	F3.0	latitude (degrees N)
20-24	F5.1	latitude (minutes to nearest tenth)
25-28	F4.0	longitude (degrees)
29-33	F5.1	longitude (minutes to nearest tenth)
34-45	3A4	date/time group

Station data card:

<u>Column</u>	<u>Format</u>	<u>Item</u>
1-8	F8.1	observed depth
9	A1	(see below)
10	1X	blank
11-19	F9.2	temperature (°C)
20	A1	(see below)
21-30	F10.3	salinity (°/°)
31	A1	(see below)
32-39	F8.2	oxygen (ml/l)
40	A1	(see below)
41-48	8X	blank
49-80	4A8	comments that user wishes to include; these comments will appear alongside station data in the printed output

The alpha space immediately behind the values of depth, temperature, salinity and oxygen content may be used to indicate the supposed validity of that value. For instance, if the value is questionable, a question mark (?) may be used; if the value is adjusted relative to the other data, an asterisk (*) may be used; and if one wishes to indicate no value, the letter X may be used. This last notation is particularly useful in the oxygen column where some values might be missing and the normal "0.0" output would be misleading.

(d) After all station data have been assembled, the final card in the data deck must be a blank.

C. CALLING SEQUENCE FOR HYDRO

Program HYDRO is currently stored as an object deck on a disk at the NPS computer facility. This program is in machine language in order to minimize compile time. The source language version of the program is presented at the end of this instruction.

If an extenuating case exists, the source deck for HYDRO may be obtained from the Oceanography Department. However, for most cases it is advantageous for the user to access the library version as follows:


```
//Jobcard  
//JØBLIB DD DSNAME=F2853.ØCEANØ,DISP=SHR,  
// VØLUME=SER=CEL002,UNIT=2321  
//GØ EXEC PGM=HYDRØ,REGIØN=100K  
//FT06F001 DD SYSØUT=A,SPACE=(CYL,(1,1)),  
// DCB=(RECFM=FBA,LRECL=133,BLKSIZE=3325)  
//FT05F001 DD *  
(data deck as described above)  
/* (standard orange card)
```



```

REAL *8 ITL(12),INFO(50,4)
DIMENSION ID(50),IT(50),IS(50),IO(50)
DIMENSION D(50),T(50),S(50),O2(50),SNDV(50)
DIMENSION SD(24),ST(24),SS(24),SGT(24),SV(24),SVA(24)
DIMENSION SGP(24),DH(24),BDH(24),DD(24),SLEV(48),BSVA(24)
DIMENSION NPA(48),NPB(48),ND(48),NSTA(48,3),ALT(48),ALM(48)
DIMENSION ALN(48),ANM(48),IDATE(48,3),DHT(48,24),ADH(24)
8  FORMAT (1H1,'STATION ',3A4,' LATITUDE ',12,F5.1,'N LONGITUDE ',
113,F5.1,'W DATE ',3A4/5X,' TO ',3A4,' LATITUDE ',12,F5.1,
2  'N LONGITUDE ',13,F5.1,'W DATE ',3A4//)
9  FORMAT (8(1X,212,F5.0))
10 FORMAT (1H1,'STATION ',3A4,' LATITUDE = ',12,F5.1,'N LONGITUDE = ',
114,F5.1,'W DATE ',3A4//)
11 FORMAT (10X,'* INDICATES ADJUSTED VALUE')
12 FORMAT (10X,'? INDICATES QUESTIONABLE VALUE')
99 FORMAT (10X,'X INDICATES NO VALUE')
13 FORMAT (14,3A4,F3.0,F5.1,F4.0,F5.1,3A4)
15 FORMAT (F8.1,A1,1X,F9.2,A1,F10.3,A1,F9.3,A1,7X,4A8)
16 FORMAT (10X,'DEPTH TEMPERATURE SALINITY SIGMA-T OXYGEN'//)
17 FORMAT (20X,'OBSERVED VALUES'//)
18 FORMAT (/20X,'INTERPOLATED VALUES'//)
19 FORMAT (10X,'DEPTH TEMPERATURE SALINITY SIGMA-T   SND VEL   SPE
1C VOL   SPEC V ANOM MEAN SVA   DELTA D   DYNAMIC HEIGHT'//)
20 FORMAT (10X,F5.0,F10.2,F12.3,F9.3,F12.2,F10.4,F12.6,25X,F10.5/80X,
12F12.6)
21 FORMAT (10X,F6.1,A1,F8.2,A1,F11.3,A1,F8.3,F9.3,A1,4X,4A8//)
DATA SD/0.,10.,20.,30.,50.,75.,100.,125.,150.,200.,250.,300.,400.,
1500.,600.,700.,800.,1000.,1200.,1400.,1600.,2000.,2500.,3000./

```

READ THE NUMBER OF GEOSTROPHIC CURRENTS & TRANSPORTS
TO BE CALCULATED

```

READ (5,13) NGC
IF(NGC.EQ.0) GC TO 410
READ (5,9) (NPA(I),NPB(I),SLEV(I),I=1,NGC)
410 NPA(NGC+1)=0
DO 41 L=1,48

```

READ HEADING CARD, CHECK FOR END OF DATA, THEN
READ NOV DATA CARDS.

```

READ (5,13) NOV,(NSTA(L,K),K=1,3),ALT(L),ALM(L),ALN(L),ANM(L),
1(IDATE(L,K),K=1,3)
IF (NOV) 32,32,24
24 DO 25 I=1,NOV
READ (5,15) D(I),ID(I),T(I),IT(I),S(I),IS(I),O2(I),IO(I),
1(INFO(I,J),J=1,4)

```


SGTSVA IS SUBROUTINE TO COMPUTE SIGMA-T, SPECIFIC VOLUME
AND SPECIFIC VOLUME ANOMALY.

25 CALL SGTSVA (T(I),S(I),D(I),SGP(I),SVNO,SVNO)

LGTP IS SUBROUTINE TO COMPUTE INTERPOLATED VALUES

CALL LGTP(NOV,D,T,SD,ST,NA)

CALL LGTP(NOV,D,S,SD,SS,NB)

NO(L)=NA

DO 27 I=1,NA

SNDVEL IS SUBROUTINE TO COMPUTE SOUND VELOCITY

CALL SNDVEL (ST(I),SS(I),SD(I),SNDV(I))

CALL SGTSVA (ST(I),SS(I),SD(I),SGT(I),SV(I),SVA(I))

27 CONTINUE

NLT=ALT(L)

NLN=ALN(L)

WRITE (6,10) (NSTA(L,K),K=1,3),NLT,ALM(L),NLN,ANM(L),

1(IDATE(L,K),K=1,3)

WRITE(6,17)

WRITE (6,16)

DO 29 I=1,NGV

29 WRITE (6,21) D(I),ID(I),T(I),IT(I),S(I),IS(I),SGP(I),O2(I),IO(I),

1(INFO(I,J),J=1,4)

WRITE(6,11)

WRITE(6,12)

WRITE(6,99)

WRITE (6,18)

WRITE(6,19)

NA=NA-1

DH(1)=0.

DO 30 I=1,NA

BSVA(I)=(SVA(I)+SVA(I+1))*0.5

DD(I)=BSVA(I)*(SD(I+1)-SD(I))

30 DH(I+1)=DH(I)+DD(I)

DO 31 I=1,NA

DHT(L,I)=DH(I)

31 WRITE (6,20) SD(I),ST(I),SS(I),SGT(I),SNDV(I),SV(I),SVA(I),DH(I),

1BSVA(I),DD(I)

I=NA+1

DHT(L,I)=DH(I)

WRITE (6,20) SD(I),ST(I),SS(I),SGT(I),SNDV(I),SV(I),SVA(I),DH(I)

41 CONTINUE

IF(NGC.EQ.0) GO TO 33

32 DO 42 L=1,48

IF (NPA(L).EQ.0) GO TO 33


```

BASE=SLEV(L)
N1=NPA(L)
N2=NPB(L)
NU1=NO(N1)
NU2=NO(N2)
DO 43 I=1,NU1
43 ADH(I)=DHT(N1,I)
DO 44 I=1,NU2
44 BDH(I)=DHT(N2,I)
NLT=ALT(N1)
NLN=ALN(N1)
MLT=ALT(N2)
MLN=ALN(N2)
WRITE (6,8) (NSTA(N1,K),K=1,3),NLT,ALM(N1),NLN,ANM(N1),
1 (IDATE(N1,K),K=1,3),(NSTA(N2,K),K=1,3),MLT,ALM(N2),MLN,
2 ANM(N2),(IDATE(N2,K),K=1,3)
ALAT=ALT(N1)+ALM(N1)/60.
ALON=ALN(N1)+ANM(N1)/60.
BLAT=ALT(N2)+ALM(N2)/60.
BLON=ALN(N2)+ANM(N2)/60.

```

DSTSTA IS SUBROUTINE TO COMPUTE DISTANCE BETWEEN STATIONS

CALL DSTSTA (ALAT,ALON,BLAT,BLON,X2,DIST)

GEOCUR IS SUBROUTINE TO COMPUTE GEOSTROPHIC CURRENTS
AND TRANSPORTS

```

42 CALL GEOCUR (NU1,ADH,NU2,BDH,SD,BASE,X2,NNN,DIST)
33 STOP
END

```



```

SUBROUTINE LGTP(N,D,V,SD,CV,NN)
DIMENSION D(N),V(N),CV(24),SD(24)
111 DO 188 J=1,24
112 DO 186 I=1,N
IF(SD(J)-D(N))113,115,190
115 CV(J)=V(N)
GO TO 191
113 IF(SD(J)-D(I))114,114,116
114 CV(J)=V(I)
GO TO 138
116 IF(SD(J)-D(I+1))120,118,186
118 CV(J)=V(I+1)
GO TO 188
120 IF(I-1)132,132,126
126 XA=(SD(J)-D(I))*(SD(J)-D(I+1))*V(I-1)/
1((D(I-1)-D(I))*(D(I-1)-D(I+1)))
XB=(SD(J)-D(I-1))*(SD(J)-D(I+1))*V(I)/
1((D(I)-D(I-1))*(D(I)-D(I+1)))
XC=(SD(J)-D(I-1))*(SD(J)-D(I))*V(I+1)/
1((D(I+1)-D(I-1))*(D(I+1)-D(I)))
ANSU=XA+XB+XC
132 IF ((I+2)-N)133,133,134
133 YA=(SD(J)-D(I+1))*(SD(J)-D(I+2))*V(I)/
1((D(I)-D(I+1))*(D(I)-D(I+2)))
YB=(SD(J)-D(I))*(SD(J)-D(I+2))*V(I+1)/
1((D(I+1)-D(I))*(D(I+1)-D(I+2)))
YC=(SD(J)-D(I))*(SD(J)-D(I+1))*V(I+2)/
1((D(I+2)-D(I))*(D(I+2)-D(I+1)))
ANSD=YA+YB+YC
134 ZA=(SD(J)-D(I+1))*V(I)/(D(I)-D(I+1))
ZB=(SD(J)-D(I))*V(I+1)/(D(I+1)-D(I))
ANSL=ZA+ZB
IF(I-1)136,136,138
136 CV(J)=(ANSU+ANSL)/2.
DLL=(ANSU+ANSL+ANSL)/3.
GO TO 188
138 IF((I+2)-N)140,140,142
140 CV(J)=(ANSU+ANSU+ANSL)/3.
UD=(ANSU+ANSU)/2.
GO TO 188
142 CV(J)=(ANSU+ANSL)/2.
ULL=(ANSU+ANSL+ANSL)/3.
GO TO 188
186 CONTINUE
188 CONTINUE
190 J=J-1
191 NN=J
RETURN
END

```



```

SUBROUTINE SNDVEL (T,S,D,SVL)
IF(D.LE.100.) GO TO 10
IF(D.LE.200.) GO TO 20
IF(D.LE.400.) GO TO 30
IF(D.LE.700.) GO TO 40
IF(D.LE.1500.) GO TO 50
IF(D.LE.2000.) GO TO 60
P=D*(.10318+(D-2000.)*2.6E-7)
GO TO 5
10 P=D*(.10245+D*3.0E-7)
GO TO 5
20 P=D*(.10248+(D-100.)*7.0E-7)
GO TO 5
30 P=D*(.10255+(D-200.)*6.0E-7)
GO TO 5
40 P=D*(.10267+(D-400.)*4.33E-7)
GO TO 5
50 P=D*(.10280+(D-700.)*3.0E-7)
GO TO 5
60 P=D*(.10304+(D-1500.)*2.7E-7)
5 CONTINUE
VT=T*(4.5721-T*(.044532-T*(2.6045E-4+T*(7.9851E-6))))
VP=P*(.160272+P*(1.0268E-5+P*(3.5216E-9-P*(3.3603E-12))))
VS=(S-35.)*(1.39799+(S-35.)*1.69202E-3)
A1=T*(-.011244+3.1580E-8*P+T*(7.7711E-7+1.5790E-9*P))
A2=P*(7.7016E-5-1.2943E-7*P)
A3=P*T*(-1.8607E-4+T*(7.4812E-6+T*(4.5283E-8)))
A4=P*P*(T*(-2.5294E-7+T*1.8563E-9)+P*T*(-1.9646E-10))
SVL=1449.14+VT+VP+VS+(S-35.)*(A1+A2)+A3+A4
RETURN
END

```



```

SUBROUTINE SGTSVA (T,S,D,SGT,SV,SVA)
ST=-(((T-3.98)**2)/503.57)*((T+283.)/(T+67.26))
CL=(S-.030)/1.805
SO=-.069+1.4708*CL-.00157*CL**2+3.98E-5*CL**3

```

```

ALTERNATE METHOD OF COMPUTING SIGMA-ZERO:
SD=-0.093+0.8149*S-.000482*S**2+6.8E-6*S**3

```

```

AT=T*(4.7867-.098185*T+.0010843*T**2)*1.E-3
BT=T*(18.030-.8164*T+.01667*T**2)*1.E-6
SGT=ST+(SD+.1324)*(1.-AT+BT*(SD-.1324))
AFST=1./(1.+SGT*1.E-3)
A=D*AFST*1.E-9
B=4886./(1.+1.83E-5*D)
C=227.+28.33*T-.551*T**2+.004*T**3
E=D*1.E-4
G=(SO-28.)/10.
H=147.3-2.72*T+.04*T**2
U=105.5+9.5*T-.158*T**2
V=1.5*D**2*T*1.E-8
W=32.4-.87*T+.02*T**2
X=4.5-.1*T
Y=1.8-.06*T
SV=AFST-A*(B-C+E*U-V-G*(H-E*W)+G**2*(X-E*Y))
AZ=.972643
YA=-227.+.01055*D
YB=.0126*(147.3-.00324*D)
AP=AZ-D*AZ*(B+YA-YB)*1.E-9
SVA=SV-AP
RETURN
END

```



```

SUBROUTINE DSTSTA(SATI,ONGI,SATII,ONGII,X2,DIST)
IMPLICIT REAL*4 (K)
REAL*8 A,E
DATA A/111132.09/,B/566.05/,C/1.20/,D/.002/
DATA E/111415.13/,F/94.55/,G/.012/
10 FORMAT (10X,'MEAN LATITUDE = ',F6.2/15X,'DISTANCE = ',F6.2,
1' KILOMETERS'/)
CON=2*3.1416/360
AATI=SATI*CON
AATII=SATII*CON
$MERI=A-B*COS(2*AATI)+C*COS(4*AATI)-D*COS(6*AATI)
PARI=E*COS(AATI)-F*COS(3*AATI)+G*COS(5*AATI)
$MERII=A-B*COS(2*AATII)+C*COS(4*AATII)-D*COS(6*AATII)
PARII=E*COS(AATII)-F*COS(3*AATII)+G*COS(5*AATII)
ALLAT=($MERI+$MERII)/2
ALLON=(PARI+PARII)/2
DLAT=SATI-SATII
DLON=ONGI-ONGII
KLAT=DLAT*ALLAT/1000
KLONG=DLON*ALLON/1000
KDIX=SQRT(KLAT**2+KLONG**2)
DIST=KDIX
W2=1.458E-4
PSI=(SATI+SATII)*0.5
PSJ=(2.*3.14159/360.)*PSI
SPSI=SIN(PSJ)
IF(SPSI.LT.0.1) SPSI=0.1
X2=1./(W2*SPSI*KDIX)
WRITE(6,10) PSI,KDIX
RETURN
END

```



```

SUBROUTINE GEOCUR(NA,ADH,NB,BDH,SD,BASE,X2,NNN,DIST)
DIMENSION ADH(NA),BDH(NB),SD(24),RVEL(24),VEL(24),AMB(24),AVT(24)
10 FORMAT (13X,'DEPTH      DYN HT      DYN HT      DIFF HT      REL VEL      ABS
. 1VEL      ABS VOL'/14X,' M.          STA A          STA B          A-B          CM/SEC
2          CM/SEC      TRANSPORT *'//)
11 FORMAT(13X,F5.0,2X,3(F9.5,1X),2(F8.2,2X)/72X,F9.5)
12 FORMAT ('***** LEVEL OF NO MOTION MUST BE EQUAL TO A STANDARD DEPT
1H *****')
14 FORMAT(' ',10X,'TOTAL VOLUME TRANSPORT IS COMPUTED BY SUMMING INCR
1EMENTAL TRANSPORTS ABOVE LEVEL OF NO MOTION:'//5X,'TOTAL TRANSPORT
2 PERPENDICULAR TO THE PLANE OF THE STATIONS IS ',F7.3,' SVERDRUPS
3RELATIVE TO ',F5.0,' METERS')
15 FORMAT('//' * VALUES IN THIS COLUMN REPRESENT TRANSPORTS IN LAYER
1 INCREMENTS'//)
      IF(NA.LE.NB) GO TO 51
      N=NB
      GO TO 52
51 N=NA
52 DO 53 I=1,N
      AMB(I)=ADH(I)-BDH(I)
53 RVEL(I)=-AMB(I)*X2
      DO 54 I=1,24
      IF(BASE.EQ.SD(I))GO TO 55
54 CONTINUE
      WRITE (6,12)
      GO TO 70
55 NM=I
      IF(NM.GT.N) NM=N
      BASE=SD(NM)
      DO 56 I=1,N
56 VEL(I)=RVEL(I)-RVEL(NM)
      DO 553 I=2,N
      J=I-1
      AVEL=(VEL(I)+VEL(J))*0.005
553 AVT(J)=AVEL*DIST*(SD(I)-SD(J))*1.0E-03
      NM=NM-1
      VT=0.
      DO 57 I=1,NM
57 VT=VT+AVT(I)

IF STATION A IS TO THE RIGHT OF STATION B AS AN OBSERVER LOOKS AT
THE PLANE OF THE STATIONS, A POSITIVE CURRENT FLOWS AWAY FROM THE
OBSERVER.

58 WRITE (6,10)
      N=N+1
      DO 60 I=1,N
60 WRITE (6,11) SD(I),ADH(I),BDH(I),AMB(I),RVEL(I),VEL(I),AVT(I)

```



```
N=N+1
I=N
WRITE (6,11) SD(I),ADH(I),BDH(I),AMB(I),RVEL(I),VEL(I)
NNN=N
WRITE(6,15)
WRITE(6,14) VT,BASE
70 RETURN
END
```


APPENDIX B
CRUISE I STATION DATA

STATION 1205-71 1 LATITUDE = 36 45.0N LONGITUDE = 122 5.0W DATE 8 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	13.55	33.287	24.887	0.0
25.0	13.51	33.339	25.025	0.0
51.0	13.04	33.401	25.167	0.0
101.0	10.54	33.686	25.854	0.0
152.0	9.21	33.904	26.247	0.0
202.0	8.65	34.000	26.411	0.0
404.0	6.75	34.164	26.816	0.0
606.0	5.38	34.247	27.056	0.0
509.0	4.16	34.424	27.333	0.0

* INDICATES ADJUSTED VALUE
? INDICATES QUESTIONABLE VALUE
X INDICATES NC VALUE

STATION 1205-71 2 LATITUDE = 36 38.8N LONGITUDE = 122 16.7W DATE 8 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.30	33.302	24.619	0.0
25.0	14.03	33.338	24.918	0.0
51.0	11.07	33.493	25.611	0.0
101.0	9.74	33.761	26.049	0.0
152.0	9.31	33.951	26.268	0.0
202.0	8.42	33.987	26.436	0.0
404.0	5.85	34.076	26.863	0.0
606.0	4.94	34.235	27.101	0.0
808.0	4.42	34.386	27.275	0.0
1111.0	4.30	34.470	27.355	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 1205-71 3 LATITUDE = 36 31.8N LONGITUDE = 122 32.0W DATE 8 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.66	33.227	24.482	0.0
25.0	14.45	33.235	24.754	0.0
49.0	12.40	33.402	25.253	0.0
98.0	9.64	33.694	26.014	0.0
147.0	8.75	33.909	26.324	0.0
196.0	8.25	34.011	26.481	0.0
391.0	6.85	34.209	26.838	0.0
587.0	5.17	34.245	27.082	0.0
784.0	4.46	34.384	27.269	0.0
1077.0	3.53	34.493	27.452	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 4 LATITUDE = 36 23.2N LONGITUDE = 122 48.7W DATE 8 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.65	33.190	24.456	0.0
25.0	13.92	33.030	24.703	0.0
49.0	11.92	33.265	25.278	0.0
98.0	9.14	33.577	26.003	0.0
147.0	8.80	33.951	26.349	0.0
196.0	8.71	34.106	26.485	0.0
251.0	6.81	34.214	26.847	0.0
587.0	5.44	34.286	27.079	0.0
783.0	4.63	34.400	27.263	0.0
1081.0	3.65	34.496	27.439	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 5 LATITUDE = 36 35.5N LONGITUDE = 122 59.0W DATE 9 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.93	32.923	24.408	0.0
25.0	14.57	33.359	24.821	0.0
49.0	11.27	33.414	25.513	0.0
99.0	9.35	33.733	26.091	0.0
148.0	8.62	33.974	26.394	0.0
197.0	7.80	33.997	26.537	0.0
393.0	6.57	34.215	26.880	0.0
590.0	4.89	34.243	27.110	0.0
787.0	4.51	34.409	27.284	0.0
1087.0	3.55	34.489	27.447	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 6 LATITUDE = 36 42.7N LONGITUDE = 122 43.0W DATE 9 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.70	33.060	24.563	0.0
25.0	14.24	33.207	24.773	0.0
50.0	11.19	33.352	25.480	0.0
101.0	9.12	33.820	26.196	0.0
152.0	8.50	33.970	26.411	0.0
202.0	8.02	34.044	26.541	0.0
404.0	6.47	34.216	26.894	0.0
606.0	5.17	34.295	27.119	0.0
808.0	4.38	34.388	27.281	0.0
1111.0	3.60	34.482	27.437	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 7 LATITUDE = 36 52.2N LONGITUDE = 122 27.2W DATE 9 NOV 70

CBERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.91	33.241	24.657	0.0
25.0	13.00	33.313	25.107.	0.0
50.0	11.07	33.421	25.555	0.0
101.0	9.41	33.724	26.075	0.0
152.0	8.79	33.940	26.342	0.0
202.0	7.52	33.984	26.509	0.0
404.0	5.96	34.101	26.869	0.0
606.0	4.90	34.238	27.105	0.0
808.0	4.33	34.375	27.276	0.0
1111.0	3.61	34.478	27.432	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 8 LATITUDE = 36 27.0N LONGITUDE = 122 7.0W DATE 9 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	13.96	33.050	24.711	0.0
25.0	13.16	33.342	25.098	0.0
50.0	11.46	33.517	25.559	0.0
101.0	9.44	33.628	25.995	0.0
303.0	7.30	34.056	26.655	0.0
504.0	5.48	34.189	26.998	0.0
706.0	4.54	34.292	27.188	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 9 LATITUDE = 36 18.0N LONGITUDE = 122 23.0W DATE 9 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.82	33.276	24.484	0.0
24.0	14.56	33.322	24.708	0.0
48.0	12.69	33.386	25.225	0.0
97.0	9.87	33.759	26.026	0.0
145.0	9.24	33.985	26.306	0.0
193.0	8.68	34.053	26.448	0.0
386.0	6.93	34.180	26.804	0.0
575.0	5.23	34.209	27.044	0.0
766.0	4.50	34.384	27.265	0.0
1056.0	3.77	34.483	27.420	0.0

* INDICATES ACJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 1205-71 10 LATITUDE = 36 9.8N LONGITUDE = 122 39.0W DATE 9 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.46	33.115	24.440	0.0
25.0	13.78	33.138	24.815	0.0
49.0	11.92	33.228	25.250	0.0
98.0	10.24	33.748	25.955	0.0
147.0	9.60	33.883	26.167	0.0
195.0	8.98	34.062	26.408	0.0
388.0	6.97	34.173	26.793	0.0
579.0	5.70	34.309	27.066	0.0
771.0	4.65	34.395	27.257	0.0
1066.0	3.73	34.482	27.424	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 11 LATITUDE = 36 23.3N LONGITUDE = 122 49.0W DATE 9 MCV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.62	33.110	24.4C1	0.0
24.0	13.81	33.159	24.825	0.0
47.0	11.92	33.381	25.368	0.0
96.0	9.36	33.580	25.970	0.0
141.0	9.16	33.968	26.305	0.0
189.0	8.70	34.061	26.451	0.0
276.0	7.02	34.194	26.803	0.0
563.0	5.65	34.309	27.072	0.0
753.0	4.64	34.363	27.233	0.0
1046.0	3.81	34.467	27.404	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 12 LATITUDE = 36 38.9N LONGITUDE = 122 16.0W DATE 9 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	15.55	33.346	24.598	0.0
25.0	15.05	33.341	24.704	0.0
49.0	11.55	33.455	25.494	0.0
99.0	9.45	33.857	26.172	0.0
148.0	8.98	33.972	26.337	0.0
198.0	8.37	34.052	26.495	0.0
396.0	6.06	34.055	26.820	0.0
594.0	5.03	34.217	27.073	0.0
794.0	4.43	34.391	27.278	0.0
1094.0	3.69	34.467	27.416	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 13 LATITUDE = 36 40.0N LONGITUDE = 122 5.0W DATE 13 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	13.77	33.215	24.877	0.0
25.0	13.67	33.295	24.959	0.0
50.0	12.38	33.439	25.326	0.0
100.0	9.70	33.803	26.089	0.0
150.0	8.95	33.901	26.287	0.0
199.0	8.34	34.009	26.466	0.0
395.0	6.82	34.173	26.813	0.0
591.0	5.10	34.218	27.066	0.0
788.0	4.46	34.373	27.261	0.0
1088.0	3.66	34.452	27.407	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 1205-71 14 LATITUDE = 36 39.1N LONGITUDE = 122 16.0W DATE 13 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.96	33.225	24.634	0.0
24.0	13.55	33.270	24.964	0.0
48.0	11.24	33.453	25.549	0.0
95.0	9.46	33.826	26.146	0.0
143.0	8.88	33.960	26.344	0.0
191.0	8.28	34.048	26.490	0.0
380.0	6.12	34.060	26.817	0.0
563.0	5.13	34.199	27.047	0.0
750.0	4.58	34.358	27.236	0.0
1042.0	3.65	34.462	27.416	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 15 LATITUDE = 36 31.5N LONGITUDE = 122 33.0W DATE 13 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.45	33.053	24.611	0.0
25.0	14.44	33.049	24.610	0.0
49.0	11.62	33.185	25.272	0.0
98.0	9.63	33.630	25.965	0.0
147.0	8.73	33.917	26.334	0.0
196.0	8.26	34.010	26.475	0.0
255.0	6.05	34.124	26.876	0.0
594.0	5.41	34.302	27.056	0.0
793.0	4.56	34.390	27.263	0.0
1052.0	3.58	34.477	27.435	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 16 LATITUDE = 36 23.3N LONGITUDE = 122 49.0W DATE 14 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.35	32.905	24.518	0.0
23.0	14.31	32.903	24.525	0.0
46.0	12.70	33.236	25.107	0.0
93.0	10.39	33.660	25.860	0.0
139.0	9.54	33.508	26.197	0.0
185.0	9.11	34.007	26.344	0.0
367.0	6.88	34.154	26.790	0.0
548.0	5.71	34.228	27.001	0.0
733.0	4.70	34.351	27.217	0.0
1024.0	3.79	34.476	27.413	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 1205-71 17 LATITUDE = 36 35.6N LONGITUDE = 122 59.0W DATE 14 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.68	33.143	24.631	0.0
25.0	14.58	33.135	24.646	0.0
51.0	12.40	33.143	25.093	0.0
101.0	9.45	33.715	26.055	0.0
152.0	8.77	33.946	26.350	0.0
202.0	8.01	33.997	26.506	0.0
404.0	5.84	34.108	26.850	0.0
606.0	5.13	34.276	27.108	0.0
808.0	4.45	34.395	27.282	0.0
1111.0	3.45	34.490	27.454	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 18 LATITUDE = 36 43.0N LONGITUDE = 122 43.0W DATE 13 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.43	33.070	24.628	0.0
25.0	14.35	33.089	24.659	0.0
50.0	11.38	33.217	25.341	0.0
99.0	9.42	33.693	26.049	0.0
149.0	8.67	33.905	26.334	0.0
199.0	8.10	34.003	26.497	0.0
398.0	6.57	34.205	26.872	0.0
598.0	4.85	34.260	27.128	0.0
797.0	4.30	34.389	27.291	0.0
1097.0	3.50	34.497	27.458	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 19 LATITUDE = 36 51.5N LONGITUDE = 122 27.0W DATE 14 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.02	33.276	24.870	0.0
24.0	13.64	33.352	25.009	0.0
48.0	11.40	33.424	25.458	0.0
96.0	9.45	33.752	26.050	0.0
144.0	8.84	33.994	26.377	0.0
192.0	8.29	34.028	26.488	0.0
282.0	5.99	34.078	26.847	0.0
575.0	4.96	34.229	27.091	0.0
770.0	4.62	34.377	27.246	0.0
1069.0	3.66	34.486	27.434	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 20 LATITUDE = 36 27.0N LONGITUDE = 122 7.0W DATE 14 NOV 70

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	13.56	33.167	24.883	0.0
25.0	13.58	33.170	24.881	0.0
51.0	12.49	33.465	25.325	0.0
101.0	9.65	33.869	26.148	0.0
152.0	9.01	34.049	26.393	0.0
202.0	8.23	34.126	26.574	0.0
404.0	6.25	34.278	26.972	0.0
606.0	5.01	34.367	27.194	0.0
808.0	4.32	34.488	27.367	0.0
1111.0	4.01	34.514	27.420	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 21 LATITUDE = 36 18.5N LONGITUDE = 122 22.9W DATE 13 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.62	32.911	24.465	0.0
21.0	14.62	32.925	24.476	0.0
43.0	11.55	33.355	25.417	0.0
86.0	9.64	33.757	26.063	0.0
129.0	9.24	33.960	26.286	0.0
172.0	8.84	34.004	26.385	0.0
342.0	7.31	34.191	26.760	0.0
513.0	6.02	34.270	26.995	0.0
690.0	4.59	34.341	27.221	0.0
974.0	3.82	34.478	27.411	0.0
1000.0	3.75	34.490	27.428	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 1205-71 22 LATITUDE = 36 10.0N LONGITUDE = 122 39.0W DATE 13 NOV 70

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	14.77	33.119	24.593	0.0
24.0	14.78	33.133	24.602	0.0
48.0	11.16	33.310	25.453	0.0
96.0	10.00	33.785	26.024	0.0
144.0	9.23	33.954	26.283	0.0
191.0	8.37	34.042	26.487	0.0
278.0	7.03	34.223	26.824	0.0
565.0	5.72	34.293	27.051	0.0
756.0	4.75	34.391	27.243	0.0
1049.0	3.76	34.499	27.434	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

APPENDIX C

CRUISE II STATION DATA

STATION 11-01 LATITUDE = 36 32.5N LONGITUDE = 121 58.0W DATE JAN 222148Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.30	33.550	25.614	0.0
10.0	11.21	33.560	25.638	0.0
19.0	11.06	33.570	25.672	0.0
30.0	10.99	33.620	25.724	0.0
51.0	10.01	33.760	26.003	0.0
77.0	9.43	33.850	26.170	0.0
103.2	9.11	33.910	26.268	0.0
162.3	8.58	33.990	26.414	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-02 LATITUDE = 36 31.0N LONGITUDE = 122 0.0W DATE JAN 222014Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	BAD TEMPERATURE
0.0	8.59	33.530	26.053	0.0	
10.0	11.23	33.520	25.603	0.0	
19.0	10.79	33.480	25.651	0.0	
30.0	10.88	33.480	25.635	0.0	
51.0	10.52	33.640	25.822	0.0	
101.0	9.54	33.850	26.152	0.0	
152.0	8.44	34.010	26.451	0.0	
201.5	8.01	34.080	26.571	0.0	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-03 LATITUDE = 36 31.3N LONGITUDE = 122 1.8W DATE JAN221730Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.22	33.140	25.310	0.0
9.0	11.15	33.130	25.315	0.0
19.0	10.82	33.120	25.364	0.0
28.0	10.71	33.130	25.393	0.0
39.0	10.62	33.150	25.424	0.0
51.0	10.37	33.830	25.956	0.0
73.6	10.07	33.835	26.051	0.0
102.0	9.67	33.910	26.177	0.0
210.5	8.10	34.067	26.547	0.0
396.4	6.72	34.179	26.832	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-04 LATITUDE = 36 29.5N LONGITUDE = 122 4.0W DATE JAN 221511Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.12	33.550	25.646	0.0
10.0	11.12	33.550	25.646	0.0
19.0	11.04	33.550	25.660	0.0
32.0	10.86	33.550	25.693	0.0
51.0	10.64	33.560	25.739	0.0
75.0	10.07	33.740	25.977	0.0
89.6	9.74	33.820	26.095	0.0
155.0	9.03	33.950	26.312	0.0
208.4	8.43	34.060	26.492	0.0
303.8	7.43	34.140	26.703	0.0
499.5	6.03	34.240	26.970	0.0
703.5	4.74	34.390	27.243	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-05 LATITUDE = 36 27.5N LONGITUDE = 122 7.0W DATE JAN 221100Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.47	33.510	25.552	0.0
10.0	11.40	33.480	25.541	0.0
19.0	11.34	33.510	25.575	0.0
32.0	11.25	33.540	25.615	0.0
51.0	10.61	33.440	25.651	0.0
76.0	9.78	33.370	25.738	0.0
104.7	9.47	33.470	25.867	0.0
145.6	8.97	33.550	26.009	0.0
207.1	8.60	33.600	26.106	0.0
201.3	7.73	33.730	26.338	0.0
507.2	5.90	33.850	26.679	0.0
698.9	4.95	33.960	26.879	0.0
901.3	4.32	34.030	27.004	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-06 LATITUDE = 36 25.0N LONGITUDE = 122 12.0W DATE JAN 220807Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	BA
0.0	11.52	33.040	25.178	0.0	
19.0	11.52	33.050	25.186	0.0	
32.0	11.49	33.040	25.183	0.0	
51.0	11.18	33.050	25.247	0.0	
76.0	10.75	33.130	25.386	0.0	
89.2	9.54	33.210	25.587	0.0	
140.9	9.03	33.370	25.859	0.0	
200.1	8.42	33.930	26.392	0.0	
285.9	7.84	34.040	26.565	0.0	
478.8	6.07	33.910	26.705	0.0	
694.2	5.02	33.810	26.752	0.0	
852.5	4.27	34.010	26.953	0.0	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-07 LATITUDE = 36 23.0N LONGITUDE = 122 16.3W DATE JAN 220545Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.56	33.450	25.488	0.0
9.0	11.54	33.440	25.484	0.0
19.0	11.48	33.450	25.503	0.0
30.0	11.45	33.440	25.501	0.0
49.0	11.07	33.490	25.609	0.0
74.0	10.14	33.630	25.880	0.0
98.3	9.40	33.770	26.112	0.0
148.3	8.86	33.900	26.300	0.0
206.3	8.12	34.000	26.492	0.0
253.4	7.47	34.130	26.689	0.0
492.2	6.15	34.210	26.931	0.0
738.2	4.56	34.380	27.255	0.0
990.3	3.80	34.450	27.391	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-08 LATITUDE = 36 16.7N LONGITUDE = 122 30.1W DATE JAN 220155Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.81	33.930	25.814	0.0
19.0	11.22	33.830*	25.845	0.0
39.0	11.05	33.800*	25.853	0.0
59.0	9.84	33.550	25.868	0.0
100.0	8.97	33.440	25.923	0.0
153.0	8.35	33.480	26.050	0.0
209.1	7.54	34.160	26.703	0.0
291.9	6.83	34.220	26.849	0.0
403.6	6.25	34.280	26.973	0.0
579.3	5.43	34.510	27.258	0.0
849.2	4.62	34.540	27.375	0.0
1213.5	3.30	34.460	27.448	0.0
1519.0	2.74	34.530	27.555	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION III-01 LATITUDE = 36 53.5N LONGITUDE = 122 5.0W DATE JAN 202148Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.17	33.550	25.637	0.0
10.0	11.08	33.550	25.653	0.0
20.0	11.10	33.550	25.650	0.0
29.0	10.77	33.560	25.716	0.0
42.0	10.72	33.600	25.756	0.0
54.0	10.51	33.680	25.855	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-02 LATITUDE = 36 52.1N LONGITUDE = 122 8.4W DATE JAN 201932Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	10.90	33.480	25.631	0.0
9.0	10.66	33.490	25.681	0.0
19.0	10.58	33.500	25.703	0.0
32.0	10.61	33.560	25.744	0.0
41.0	10.37	33.620	25.833	0.0
62.0	10.15	33.800	26.010	0.0
84.0	9.81	33.690	25.982	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-03 LATITUDE = 36 51.5N LONGITUDE = 122 10.5W DATE JAN 202110Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.28	33.550	25.617	0.0
10.0	10.77	33.540	25.701	0.0
19.0	10.61	33.530	25.721	0.0
20.0	10.53	33.530	25.735	0.0
38.0	10.42	33.590	25.801	0.0
57.0	10.07	33.710	25.954	0.0
84.7	9.78	33.840	26.104	0.0
121.4	9.52	33.820	26.132	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-04 LATITUDE = 36 50.0N LONGITUDE = 122 12.0W DATE JAN 202258Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.15	33.510	25.610	0.0
10.0	10.83	33.520	25.675	0.0
24.0	10.67	33.520	25.703	0.0
50.0	10.56	33.610	25.792	0.0
74.0	10.06	33.710	25.956	0.0
98.0	9.65	33.790	26.087	0.0
162.1	8.94	33.930	26.311	0.0
203.9	8.31	34.030	26.487	0.0
279.2	7.45	34.120	26.678	0.0
398.3	6.65	34.180	26.837	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-05

LATITUDE = 36 50.0N LONGITUDE = 122 14.0W DATE JAN 210142Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.28	33.560	25.625	0.0
9.0	11.10	33.570	25.665	0.0
20.0	10.69	33.530	25.707	0.0
30.0	10.75	33.580	25.735	0.0
48.0	10.28	33.790	25.980	0.0
98.0	9.65	33.910	26.180	0.0
147.7	9.25	34.060	26.363	0.0
200.9	8.67	34.110	26.494	0.0
300.4	7.72	34.170	26.684	0.0
357.0	6.92	34.230	26.845	0.0
501.7	5.98	34.290	27.016	0.0
603.5	5.29	34.390	27.180	0.0
756.6	4.62	34.450	27.304	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-06 LATITUDE = 36 47.7N LONGITUDE = 122 19.0W DATE JAN 210420Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.21	33.130	25.304	0.0
9.0	11.24	33.560	25.614	0.0
19.0	11.09	33.560	25.659	0.0
28.0	10.87	33.550	25.691	0.0
38.0	10.85	33.550	25.694	0.0
50.0	10.78	33.560	25.714	0.0
57.0	9.64	33.840	26.127	0.0
198.2	8.63	34.080	26.477	0.0
257.9	7.74	34.140	26.658	0.0
582.3	5.68	34.290	27.053	0.0
800.0	4.20	34.470	27.366	0.0
1175.0	3.40	34.510	27.478	0.0

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NO VALUE

STATION 111-07

LATITUDE = 36 44.0N LONGITUDE = 122 27.0W DATE JAN 210617Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.71	33.490	25.492	0.0	
19.0	11.31	33.550	25.612	0.0	
38.0	10.81	33.640	25.771	0.0	
59.0	10.08	33.760	25.991	0.0	
101.0	9.62	33.840	26.131	0.0	
151.0	9.08	33.960	26.312	0.0	
203.0	8.45	34.050	26.481	0.0	
298.5	7.71	34.130	26.654	0.0	
379.4	6.81	34.200	26.836	0.0	
598.0	5.33	34.300	27.104	0.0	
750.5	4.19	34.440	27.343	0.0	BAD CEPTH
1234.1	3.36	34.530	27.498	0.0	
1243.0	2.85	34.590	27.593	0.0	BAD CEPTH

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NC VALUE

STATION III-08 LATITUDE = 36 36.0N LONGITUDE = 122 45.0W DATE JAN 211202Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.48	33.470	25.519	0.0	
19.0	11.21	33.470	25.568	0.0	
38.0	11.20	33.480	25.577	0.0	
58.0	10.15	33.690	25.925	0.0	
100.0	8.57	33.880	26.267	0.0	
151.0	8.31	33.990	26.456	0.0	
204.0	7.89	34.050	26.565	0.0	
290.0	7.15	34.140	26.736	0.0	BAD DEPTH
404.0	6.37	34.220	26.910	0.0	
611.0	5.24	34.320	27.130	0.0	
517.0	4.15	34.450	27.355	0.0	
1000.0	3.33	34.520	27.493	0.0	BAD DEPTH
1500.0	2.71	34.570	27.550	0.0	BAD DEPTH

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

APPENDIX D
CRUISE III STATION DATA

STATION	STATION 8	LATITUDE = 36 47.5N	LONGITUDE = 121 55.0W	DATE	FEB 121830U
OBSERVED VALUES					
DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.97	32.821	24.532	0.0	9
10.00	12.54	33.159	25.078	0.0	0
19.00	12.25	33.261	25.213	0.0	0
28.0	12.04	33.313	25.293	0.0	0
71.00	11.16	33.437	25.551	0.0	0
93.00	10.86	33.496	25.651	0.0	0
144.00	10.10	33.664	25.913	0.0	0
193.00	8.76	33.928	26.338	0.0	0
243.00	8.02	34.023	26.525	0.0	0

* INDICATES ADJUSTED VALUE
? INDICATES QUESTIONABLE VALUE
X INDICATES NO VALUE

STATION 8 (A,2X)
12 FEB 1830 U 1970
36 47.5N 121 55.0W
WIND(SPD/DIR) 05KTS/260T
AIRTEMP(W/C) 12.8/13.9
SWELL(H/L/D) 4/10/21C
BARC 1019.3 MB
CLCUD CI/.2 VIS 10NM

STATION 10 LATITUDE = ** 47.0N LONGITUDE = 1220 1.0W DATE FEB 121400U

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	13.07	32.701	24.621	0.0
9.00	12.95	32.710	24.652	0.0
18.00	12.49	32.892	24.882	0.0
28.0	11.64	33.277	25.340	0.0
46.00	11.31	33.433	25.521	0.0
69.00	11.13	33.458	25.573	0.0
92.00	10.55	33.564	25.758	0.0
183.00	8.87	33.938	26.328	0.0
374.00	6.86	34.165	26.802	0.0
563.00	5.49	34.270	27.061	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 10 (N,2X)
 12 FEB 1400 U 1970
 36 47.0N 122 01.0W
 WIND(SPD/DIR) 20KTS/210T
 AIRTEMP(W/C) 14.4/15.6
 SWELL(H/L/D) 5/10/210
 BARO 1019.6 MB
 CLCUD ST/.8 VIS 10NM

STATION A1 LATITUDE = 36 58.3N LONGITUDE = 122 56.5W DATE FEB 042313U

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.58	30.675	23.152	0.0	7
10.00	12.74	31.192	23.520	0.0	2
20.00	13.00	32.763	24.683	0.0	2
30.0	12.58	32.807	24.721	0.0	4
50.00	12.52	33.068	25.012	0.0	1
75.00	10.45	33.216	25.458	0.0	2
100.00	9.65	33.536	25.882	0.0	9
150.00	8.66	33.791	26.246	0.0	9
158.00	8.55	34.022	26.444	0.0	1
257.00	7.35	34.072	26.661	0.0	9
385.00	6.39	34.132	26.839	0.0	4
482.00	5.75	34.195	26.968	0.0	9
575.00	5.44	34.257	27.057	0.0	9
773.00	4.56	34.384	27.258	0.0	8
967.00	3.80	34.472	27.405	0.0	0
1160.00	3.40	34.518	27.485	0.0	1
1454.00	2.84	34.564	27.574	0.0	4
1751.00	2.28	34.611	27.655	0.0	3

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION A1 (2N,2X)
 4 FEB 2313 L 1970
 36 58.3N 122 56.5W
 WIND(SPD/DIR) 05KTS/340T
 AIRTEMP(W/D) 10.3/13.6
 SWELL(H/L/D) 5/20/320
 BARO 1015.5 MB
 CLOUD CU/.5 VIS 8NM

STATION C LATITUDE = 36 39.3N LONGITUDE = 123 37.5W DATE FEB 050816U

OBSERVED VALUES

DEPTH TEMPERATURE SALINITY SIGMA-T OXYGEN

0.0	12.77	31.422	23.692	0.0	7	STATION C (2N,3X)
10.00	12.82	31.792	23.968	0.0	2	5 FEB 0816 L 1970
20.00	13.16	32.844	24.714	0.0	1	36 39.3N 123 37.5W
30.0	13.15	32.860	24.728	0.0	5	WIND(SPD/DIR) C8KTS/310T
50.00	13.11	33.143	24.954	0.0	5	AIRTEMP(W/D) 11.1/12.8
75.00	11.40	33.386	25.468	0.0	8	SWELL(H/L/C) 4/10/320
100.00	10.15	33.697	25.930	0.0	8	BARO 1016.3 MB
150.00	9.52	33.915	26.206	0.0	7	CLCUD ST/.7 VIS 10NM
200.00	9.03	34.023	26.369	0.0	6	
257.00	7.91	34.160	26.649	0.0	9	
358.00	6.47	34.146	26.839	0.0	1	
458.00	6.16	34.204	26.925	0.0	9	
558.00	5.51	34.289	27.073	0.0	5	
757.00	4.61	34.359	27.233	0.0	0	
956.00	3.91	34.447	27.378	0.0	3	
1155.00	3.42	34.503	27.471	0.0	6	
1455.00	2.81	34.565	27.577	0.0	7	
1552.00	2.08	34.621	27.683	0.0	4	
2450.00	1.81	34.653	27.730	0.0	5	
2589.00	1.62	34.665	27.754	0.0	2	
3587.00	1.51	34.688	27.781	0.0	0	

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		
0.0	13.32	32.853	24.689	0.0	6	STATION E (2N,3X)
10.00	13.25	32.851	24.701	0.0	4	5 FEB 2210 U 1970
20.00	13.20	32.861	24.719	0.0	6	26 18.5N 124 19.6W
30.00	13.19	32.865	24.724	0.0	1	WIND(SPD/DIR) 05KTS/240T
50.00	12.26	33.052	25.030	0.0	5	AIRTEMP(W/C) 11.9/13.6
75.00	11.50	33.424	25.479	0.0	3	SWELL(H/L/D) NONE
100.00	9.95	33.666	25.940	0.0	2	BARC 1020.2 MB
200.00	8.65	34.006	26.416	0.0	7	CLCUD +/- VIS
300.00	7.67	34.134	26.663	0.0	7	
399.00	6.71	34.159	26.817	0.0	8	
500.00	6.05	34.202	26.938	0.0	+	
600.00	5.45	34.266	27.062	0.0	+	
700.00	5.01	34.319	27.156	0.0	+	
800.00	4.61	34.366	27.239	0.0	+	
900.00	4.32	34.413	27.308	0.0	+	
1000.00	3.98	34.444	27.368	0.0	+	
1200.00	3.48	34.502	27.464	0.0	+	
1500.00	2.83	34.550	27.563	0.0	+	
2000.00	2.11	34.605	27.668	0.0	+	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION STATION F LATITUDE = 36 6.0N LONGITUDE = 122 26.5W DATE FEB 100315U

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		STATION F (2N,2X)
0.0	12.75	33.174	25.049	0.0	+	1C FEB 0315 U 1970
10.00	12.72	33.209	25.082	0.0	+	36 06.0N 122 26.5W
20.00	12.74	33.239	25.101	0.0	+	WIND(SPD/DIR) 07KTS/123T
30.00	12.74	33.248	25.108	0.0	+	AIRTEMP(W/C) 13.3/14.4
50.00	11.99	33.333	25.318	0.0	+	SHELL(H/L/C) 3/10/16C
75.00	10.26	33.611	25.845	0.0	+	BARO 1012.2 MB
100.00	9.63	33.481	25.849	0.0	+	CLCUD CLEAR VIS 10NM
150.00	8.98	33.572	26.025	0.0	+	
200.00	8.12	33.582	26.165	0.0	+	
250.00	7.35	33.614	26.301	0.0	+	
300.00	7.08	33.654	26.370	0.0	+	
359.00	6.30	34.138	26.855	0.0	+	
459.00	5.62	34.190	26.982	0.0	+	
559.00	5.21	34.265	27.090	0.0	+	
658.00	4.79	34.312	27.176	0.0	+	
798.00	4.45	34.370	27.259	0.0	+	
958.00	3.85	34.453	27.389	0.0	+	
1157.00	3.34	34.501	27.477	0.0	+	
1497.00	2.67	34.545	27.573	0.0	+	
1500.00	2.67	34.545	27.573	0.0	+	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

STATION G LATITUDE = 35 58.5N LONGITUDE = 122 42.7W DATE FEB 100822U

OBSERVED VALUES

DEPTH TEMPERATURE SALINITY SIGMA-T OXYGEN

0.0	12.93	32.994	24.875	0.0	3	STATION G (N,2X)
24.00	12.92	32.993	24.876	0.0	7	10 FEB 0822 U 1970
49.00	12.53	33.212	25.121	0.0	3	35 58.5N 122 42.7W
74.0	10.19	33.318	25.628	0.0	7	WIND (SPD/DIR) 12KTS/100T
98.00	9.55	33.572	25.933	0.0	0	AIRTEMP (W/D) 12.8/13.9
194.00	8.61	34.025	26.437	0.0	0	SWELL (H/L/D) 5/ +/18C
388.00	6.63	34.163	26.831	0.0	1	BARC 1011.9 MB
681.00	4.78	34.349	27.206	0.0	0	CLCUD CU, NS/.9 VIS 1CNM
976.00	3.93	34.464	27.389	0.0	+	
1173.00	3.37	34.505	27.477	0.0	+	

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NC VALUE

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.19	33.120	24.921	0.0	+
10.00	13.14	33.129	24.938	0.0	+
20.00	13.11	33.158	24.997	0.0	+
30.0	13.12	33.200	24.996	0.0	+
50.00	13.01	33.196	25.015	0.0	+
75.00	12.21	33.402	25.330	0.0	+
100.00	10.70	33.507	25.687	0.0	+
200.00	8.70	34.000	26.403	0.0	+
300.00	7.52	34.126	26.679	0.0	+
400.00	6.70	34.161	26.820	0.0	+
476.00	6.07	34.210	26.941	0.0	+
570.00	5.54	34.291	27.071	0.0	+
662.00	4.95	34.351	27.188	0.0	+
755.00	4.51	34.366	27.250	0.0	+
942.00	3.89	34.456	27.387	0.0	+
1130.00	3.49	34.494	27.457	0.0	+
1416.00	2.90	34.547	27.555	0.0	+
1898.00	2.16	34.616	27.673	0.0	+
2388.00	1.84	34.648	27.724	0.0	+

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION H (2N,X)
 10 FEB 1328 U 1970
 35 46.5N 123 06.0W
 WIND(SPD/DIR) 07KTS/123T
 AIRTEMP(W/L) 13.9/16.1
 SWELL(H/L/D) 5/+/+
 BARO 1012.2 MB
 CLCUC CU,NS/.1 VIS 10M

STATION STATION I LATITUDE = 35 37.0N LONGITUDE = 123 24.0W DATE FEB 102337U

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.20	33.103	24.906	0.0	2
25.00	13.13	33.127	24.938	0.0	3
50.00	13.14	33.214	25.003	0.0	2
75.0	11.85	33.329	25.341	0.0	3
100.00	10.54	33.551	25.750	0.0	9
200.00	8.31	33.930	26.409	0.0	9
359.00	6.13	34.124	26.866	0.0	9
698.00	4.63	34.351	27.225	0.0	7
999.00	3.80	34.465	27.403	0.0	0
1200.00	3.35	34.513	27.486	0.0	1

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I (N,2X)
 10 FEB 2337 U 1970
 35 37.0N 123 24.0W
 WIND(SPD/DIR) 07KTS/120T
 AIRTEMP(W/D) 13.9/15.0
 SWELL(H/L/C) 3/5/170
 BARO 1013.5 MB
 CLCUC CLEAR VIS 12NM

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.68	33.058	24.774	0.0	1
10.00	13.64	33.053	24.778	0.0	5
20.00	13.52	33.064	24.809	0.0	3
30.0	13.32	33.105	24.881	0.0	1
50.00	12.95	33.139	24.983	0.0	0
75.00	10.44	33.309	25.579	0.0	3
100.00	9.63	33.595	25.938	0.0	3
159.00	8.21	34.010	26.486	0.0	9
259.00	7.17	34.096	26.705	0.0	4
359.00	6.41	34.157	26.856	0.0	9
459.00	5.60	34.230	27.016	0.0	3
559.00	5.03	34.274	27.118	0.0	3
658.00	4.74	34.356	27.216	0.0	4
758.00	4.34	34.412	27.305	0.0	2
958.00	3.79	34.487	27.422	0.0	4
1157.00	3.34	34.529	27.499	0.0	2
1457.00	2.73	34.583	27.598	0.0	6
1956.00	2.06	34.628	27.691	0.0	8
2456.00	1.80	34.671	27.745	0.0	

STATION J (2N,3X)
 11 FEB 0324 U 1970
 35 25.5N 123 51.5W
 WIND(SPD/DIR) C7KTS/165T
 AIRTEMP(W/C) 13.9/16.1
 SWELL(H/L/C) 2/10/160
 BARO 1014.2 MB
 CLOUD CLEAR VIS 10NM

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION K LATITUDE = 36 15.0N LONGITUDE = 122 7.0W DATE .FEB 120710U

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.29	33.090	24.878	0.0	6
10.00	13.29	33.103	24.888	0.0	9
20.00	13.31	33.108	24.887	0.0	1
30.0	13.32	33.110	24.887	0.0	5
49.00	12.99	33.180	25.007	0.0	2
74.00	11.18	33.299	25.440	0.0	9
99.00	10.32	33.554	25.790	0.0	6
198.00	8.29	33.987	26.456	0.0	6
396.00	6.50	34.198	26.876	0.0	1
594.00	5.54	34.302	27.080	0.0	1

STATION K (N,2X)
 12 FEB 0710 U 1970
 36 15.0N 122 07.0W
 WIND(SPD/CIR) 20KTS/150T
 AIRTEMP(W/D) 12.2/12.8
 SWELL(H/L/D) 6/10/170
 BARG 1015.2 MB
 CLOUD CU/.5 VIS 8NM

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION STATION P LATITUDE = 37 4.2N LONGITUDE = 122 46.5W DATE FEB 131612U

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.15	31.321	23.541	0.0	3
24.00	12.92	32.622	24.590	0.0	3
48.00	11.63	33.145	25.239	0.0	2
95.0	9.82	33.652	25.951	0.0	5
192.00	8.47	34.033	26.465	0.0	5
338.00	7.02	34.148	26.766	0.0	+
535.00	5.65	34.248	27.019	0.0	0
634.00	4.81	34.351	27.204	0.0	6

STATION P (N,X)

13 FEB 1612 U 1970

27 04.2N 122 46.5W

WIND(SPD/DIR) 20KTS/250T

AIRTEMP(W/C) 14.0/15.1

SWELL(H/L/D) 5/4C/28C

BARC 1013.2 MB

CLCUD CI,CU/1. VIS 10NM

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION STATION A2 LATITUDE = 36 59.2N LONGITUDE = 122 56.2W DATE FEB 131828U

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.15	32.113	24.152	0.0	8
25.00	13.06	32.675	24.603	0.0	4
50.00	12.52	32.966	24.933	0.0	0
100.00	10.26	33.569	25.812	0.0	2
150.00	9.04	33.847	26.230	0.0	0
200.00	8.35	34.017	26.471	0.0	3
400.00	6.30	34.153	26.867	0.0	3
600.00	5.29	34.273	27.087	0.0	7
800.00	4.45	34.377	27.265	0.0	9
1200.00	3.26	34.491	27.477	0.0	2

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION A2 (N,X)
 13 FEB 1828 U 1970
 36 59.2N 122 56.2W
 WIND(SPD/DIR) 13KTS/280T
 AIRTEMP(W/C) 10.6/12.2
 SWELL(H/L/C) 10/5C/2EC
 BARC 1013.9 MB
 CLCUD AS/.6 VIS 10NM

STATION STATION Q LATITUDE = 36 41.0N LONGITUDE = 122 25.0W DATE FEB 132322U

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.11	31.822	23.935	0.0	2
25.00	12.90	32.962	24.856	0.0	3
50.00	11.78	33.361	25.379	0.0	4
100.0	10.01	33.634	25.905	0.0	8
150.00	9.11	33.913	26.271	0.0	7
200.00	8.53	34.019	26.445	0.0	2
400.00	6.53	34.191	26.867	0.0	6
600.00	5.35	34.302	27.103	0.0	7
800.00	4.61	34.394	27.261	0.0	2
1000.00	3.87	34.476	27.405	0.0	5
1200.00	3.35	34.521	27.492	0.0	3

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION Q (N,2X)
 13 FEB 2322 U 1970
 36 41.0N 122 25.0W
 WIND(SPD/DIR) 12KTS/210T
 AIRTEMP(W/C) 11.8/14.4
 SWELL(H/L/C) 10/25/250
 EARG 1001 MB
 CLCUD CU/.2 VIS 10NM

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.24	32.645	24.544	0.0	5
10.00	13.24	32.652	24.580	0.0	2
24.00	13.15	32.795	24.670	0.0	8
49.0	12.75	33.117	25.005	0.0	9
74.00	10.81	33.258	25.506	0.0	0
98.00	10.27	33.450	25.718	0.0	7
147.00	9.48	33.803	26.125	0.0	9
196.00	8.44	34.000	26.444	0.0	8
238.00	7.92	34.043	26.555	0.0	5
285.00	7.42	34.102	26.674	0.0	8
295.00	7.22	34.118	26.715	0.0	5
394.00	6.29	34.157	26.871	0.0	3
574.00	5.40	34.287	27.085	0.0	4
770.00	4.54	34.460	27.321	0.0	0
867.00	3.93	34.390	27.330	0.0	7
1164.00	3.38	34.502	27.474	0.0	9
1262.00	3.15	34.518	27.509	0.0	7
1459.00	2.76	34.550	27.565	0.0	5
1852.00	2.16	34.602	27.662	0.0	2
2343.00	1.87	34.644	27.718	0.0	2

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION R (2N,X)
 14 FEB 0430 U 1970
 36 34.5N 122 39.0W
 WIND (SPD/DIR) 17KTS/310T
 AIRTEMP (W/C) 11.8/12.8
 SWELL (H/L/C) +/-/+
 BARC 1035 ME
 CLCUD +/- VIS 10NM

STATION S LATITUDE = 36 24.2N LONGITUDE = 123 0.4W DATE FEB 140536U
 OBSERVED VALUES
 DEPTH TEMPERATURE SALINITY SIGMA-T OXYGEN
 0.0 13.09 31.875 23.980 0.0 0
 24.00 13.14 32.921 24.777 0.0 2
 49.00 12.81 33.160 25.027 0.0 6
 58.0 10.10 33.516 25.798 0.0 1
 147.00 9.07 33.849 26.227 0.0 2
 195.00 8.53 33.992 26.423 0.0 5
 395.00 6.23 34.122 26.851 0.0 8
 595.00 5.25 34.261 27.082 0.0 5
 795.00 4.50 34.377 27.260 0.0 4
 995.00 3.85 34.443 27.376 0.0 +
 1195.00 3.35 34.439 27.427 0.0
 * INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION S (N,2X)
 14 FEB 0936 1970
 26 24.2N 123 00.4W
 WIND(SPD/CIR) 08KTS/350T
 AIRTEMP(W/C) 11.7/15.0
 SWELL(H/L/D) 8/25/30C
 EARC 1006.0 MB
 CLCUD CU/.6 VIS 10NM

STATION T LATITUDE = 36 14.0N LONGITUDE = 123 19.7W DATE FEB 14 1215U

CBSERVEC VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.23	31.897	23.969	0.0	8
10.00	13.06	31.898	24.003	0.0	1
25.00	13.43	32.740	24.580	0.0	7
50.0	13.04	32.904	24.784	0.0	8
75.00	10.95	32.960	25.218	0.0	6
100.00	9.60	33.222	25.652	0.0	2
150.00	9.56	33.850	26.148	0.0	5
200.00	8.69	33.998	26.403	0.0	2
245.00	7.97	34.087	26.583	0.0	8
292.00	7.30	34.119	26.705	0.0	6
400.00	6.56	34.205	26.874	0.0	1
588.00	5.31	34.311	27.115	0.0	7
787.00	4.48	34.397	27.278	0.0	2
986.00	3.90	34.463	27.391	0.0	7
1185.00	3.38	34.507	27.478	0.0	5
1384.00	2.96	34.551	27.552	0.0	0
1583.00	2.50	34.577	27.614	0.0	2
1980.00	2.02	34.626	27.692	0.0	8
2478.00	1.78	34.657	27.736	0.0	2

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION T (2N,X)
 14 FEB 1215 U 1970
 36 14.0N 123 19.7W
 WIND(SPD/DIR) 07KTS/12
 AIRTEMP(W/C) 11.1/14.4
 SWELL(H/L/D) 8/30/25F
 BARC 1008 MB
 CLOUD CU/.4 VIS 10NM

STATION STATION U LATITUDE = 36 5.0N LONGITUDE = 123 40.5W DATE FEB 142031U

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		STATION U (N,X)
0.0	13.37	33.047	24.828	0.0	0	14 FEB 2031 U 1970
24.00	13.35	33.091	24.866	0.0	3	35 05.0N 123 40.5W
49.00	13.04	33.261	25.059	0.0	4	WIND(SPD/DIR) 34KTS/220T
98.0	10.67	33.501	25.688	0.0	8	AIRTEMP(W/C) 10.6/13.3
146.00	9.46	33.818	26.140	0.0	1	SWELL(H/L/D) +/-
194.00	8.78	34.018	26.405	0.0	6	BARC 1008 ME
389.00	6.99	34.172	26.789	0.0	0	CLCUD +/- VIS 10NM
587.00	5.43	34.277	27.074	0.0	2	
785.00	4.58	34.416	27.282	0.0	0	
983.00	3.92	34.494	27.414	0.0	1	
1181.00	3.40	34.532	27.456	0.0	1	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

*STATION STATION V LATITUDE = 35 54.5N LONGITUDE = 124 7.0W DATE FEB 15C040U

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.45	33.086	24.842	0.0	7
10.00	13.43	33.087	24.847	0.0	5
24.00	13.40	33.087	24.853	0.0	5
49.0	13.33	33.107	24.883	0.0	2
74.00	12.50	33.297	25.193	0.0	7
98.00	10.78	33.438	25.620	0.0	7
148.00	9.36	33.676	26.045	0.0	0
157.00	8.22	33.964	26.449	0.0	7
242.00	8.05	34.037	26.531	0.0	3
290.00	7.63	34.089	26.634	0.0	7
394.00	6.55	34.148	26.830	0.0	3
590.00	5.33	34.267	27.078	0.0	3
790.00	4.45	34.394	27.278	0.0	2
990.00	3.83	34.471	27.405	0.0	2
1190.00	3.28	34.524	27.501	0.0	6
1390.00	2.84	34.556	27.567	0.0	0
1590.00	2.51	34.582	27.617	0.0	9
1990.00	1.98	34.622	27.692	0.0	3
2490.00	1.78	34.661	27.739	0.0	0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION V (2N,2X)
 15 FEB 0040 U 1970
 35 54.5N 124 07.0W
 WIND(SPD/DIR) 04KTS/220T
 AIRTEMP(W/C) 10.6/12.2
 SWELL(H/L/D) 7/25/28C
 BARO 1058 MB
 CLCUD CB/.4 VIS 10NM

APPENDIX E. CRUISE IV STATION DATA

STATION I-1 SVTC LATITUDE = 36 54.2N LONGITUDE = 121 48.7W DATE FEB 272334Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-1	77M	SST=9.59
3.0	9.59	33.720	26.042	0.0	X		
5.0	9.58	33.760	26.075	0.0	X	27 FEB 71	2334GMT
10.0	9.58	33.810	26.114	0.0	X	36 54.2N	121 48.7W
15.0	9.55	33.830	26.134	0.0	X	SALINITIES CALCULATED FROM	
20.0	9.44	33.770	26.106	0.0	X	WILSON'S EQUATION USING	
25.0	9.32	33.820	26.164	0.0	X	TEMPERATURE AND DEPTH	

STATION I-2 LATITUDE = 36 47.5N LONGITUDE = 121 51.5W DATE FEB 280044Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-2	202M	SST 9.7*
0.0	9.88	33.748	26.016	5.249		28 FEB 71	0044GMT
10.0	9.89	33.755	26.019	4.991		36 47.5N	121 51.5W
20.0	9.36	33.860	26.189	3.337		AIRTEMP(W/D) 51/52F	
29.5	8.91	33.969	26.346	2.164		WIND 350/22KT WA 20	
49.5	8.41	34.077	26.508	1.490		BARO 32.2*IN VIS 10MI	
74.0	8.12	34.093	26.565	1.727		SEA 295/5FT	
99.0	7.89	34.116	26.617	1.357		SWELL 280/3FT	
124.0	7.76	34.107	26.629	1.346			

* INDICATES ADJUSTED VALUE
? INDICATES QUESTIONABLE VALUE
X INDICATES NO VALUE

STATION I-3 LATITUDE = 36 46.9N LONGITUDE = 121 53.9W DATE FEB 280200Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-3	512M	SST
0.0	9.88	33.755	26.021	5.742	28 FEB 71	0300GMT	5.86
10.0	9.86	33.765	26.032	5.567			
20.0	9.86	33.758	26.027	5.591	36 46.9N	121 53.5W	
30.0	9.87	33.767	26.032	5.470	AIRTEMP(W/D) 48/50F		
49.0	9.30	33.915	26.242	2.911	WIND 340/25KT WA 05		
73.0	8.56	34.001	26.363	2.535	BARO 31.55IN VIS 10MI		
103.0	8.54	34.076	26.488	2.162	SEA 255/3FT		
122.0	8.26	34.136	26.577	1.974	SWELL 28C/5FT		

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-4 LATITUDE = 36 47.0N LONGITUDE = 121 55.2W DATE FEB 280544Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	CXYGEN	
0.0	9.89	33.848	26.092	4.181	I-4 497M SST 9.91
10.0	9.94	33.844	26.080	3.771	28 FEB 71 0544GMT
20.0	9.67	33.910	26.177	3.089	36 47.0N 121 55.2W
30.0	9.16	34.046	26.366	1.686	AIRTEMP(W/C) 41/45F
50.0	8.83	34.135	26.489	1.610	WIND 025/? WA 00
75.0	8.56	34.191	26.575	1.748	BARO 30.25IN VIS 10MI
100.0	8.38	34.211	26.618	1.529	SEA 30C/3FT
125.0	8.27	34.224	26.645	1.297	SWELL 28C/5FT
175.0	8.05	34.261	26.707	1.224	NO THERMCMETRIC DEPTHS

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION I-5 LATITUDE = 36 44.8N LONGITUDE = 121 56.2W DATE FEB 280652Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.85	33.846	26.097	5.395	I-5 105M SST 9.84
10.0	9.84	33.763	26.034	4.763	28 FEB 71 0652GMT
20.0	9.60	33.908	26.187	4.349	36 44.8N 121 56.2W
30.0	9.11	34.054	26.381	2.888	AIRTEMP(W/C) 41/45F
50.0	8.88	34.120	26.469	2.704	WIND 020/17;WA C;830.27
75.0	8.65	34.492	26.796	2.413	SEA 295/5 SWELL 280/3

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-6 LATITUDE = 36 43.8N LONGITUDE = 121 59.9W DATE FEB 280819Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.78	33.871	26.128	5.611	I-6 30CM SST 9.77
10.0	9.79	33.871	26.127	5.553	28 FEB 71 0819GMT
20.0	9.55	33.943	26.223	4.196	36 43.8N 121 59.9W
30.0	9.18	34.041	26.359	2.747	AIRTEMP ?
50.0	8.97	34.094	26.434	2.505	WIND 025/16KT WA 00
75.0	8.68	34.170	26.539	2.354	BARO 30.26IN
100.0	8.34	34.222	26.633	2.345	SEA ? SWELL ?

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-7 LATITUDE = 36 42.8N LONGITUDE = 122 2.1W DATE FEB 28C538Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-7	1000M	SST 9.54
0.0	9.55	33.800	26.104	0.0	28 FEB 71	0938GMT	
10.0	9.58	33.803	26.108	0.0	36 42.8N	122 C2.1W	
20.0	9.54	33.803	26.115	0.0			
30.0	9.40	33.815	26.147	0.0			
50.0	9.28	33.835	26.182	0.0			
75.0	8.70	34.027	26.424	0.0			
100.0	8.53	34.074	26.488	0.0			
150.0	8.13	34.114	26.580	0.0			
202.0	7.70	34.174	26.650	0.0			
304.0	6.55	34.215	26.826	0.0			
406.0	6.04	34.214	26.948	0.0			
492.0	5.74	34.272	27.056	0.0			

NO OXYGEN SAMPLES

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-8 LATITUDE = 36 41.4N LONGITUDE = 122 5.7W DATE FEB 281055Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-8	1450M	SST 9.26
0.0	9.50	33.786	26.108	4.195	28	FEB 71	1055GMT
10.0	9.28	33.787	26.145	4.145	36	41.4N	122 05.7W
30.0	9.26	33.784	26.146	4.146			
50.0	9.21	33.886	26.233	4.125			
75.0	8.93	33.939	26.320	2.887			
100.0	8.65	34.021	26.428	2.715			
150.0	8.21	34.110	26.549	2.046			
200.0	7.73	34.140	26.659	1.678			
289.0	7.04	34.208	26.811	1.331			
380.0	6.60	34.213	26.875	1.210			
474.0	5.69	34.255	27.024	0.809			
769.0	5.52	34.255	27.045	0.0	X		

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION I-9 LATITUDE = 36 38.9N LONGITUDE = 122 12.0W DATE FEB 272008Z

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-9	1150M	SST 9.79
0.0	9.77	33.517	25.854	5.845	27 FEB 71	2008GMT	
5.5	9.71	33.520	25.866	5.734	36 38.9N	122 12.0W	
29.0	9.43	33.695	26.049	4.986	AIRTEMP(W/D)	50/50F	
49.0	9.28	33.906	26.238	4.990	WIND 010/4KT	WA 22	
73.5	9.12	33.996	26.334	3.100	BARO 30.03IN	VIS 8MI	
93.0	8.70	34.061	26.451	1.967	SEA 31C/1FT		
189.0	7.83	34.234	26.718	1.879	SWELL 30C/5FT		
278.0	7.30	34.274	26.826	1.255	RAIN		
367.0	6.66	34.315	26.947	1.194			
455.0	5.98	34.331	27.048	0.748			
758.0	4.46	34.497	27.359	0.500			
558.0	3.96	34.557	27.460	0.327			

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-10 LATITUDE = 36 35.6N LONGITUDE = 122 21.3W DATE FEB 27 1963

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	I-10	1866M	SST
0.0	9.89	33.320	25.681	6.020*	27 FEB 71	0933GMT	9.9*
15.0	5.88	33.319*	25.681	6.020*			
25.0	9.79	33.402	25.761	5.623	36 35.6N	122 21.3W	
49.0	9.71	33.624	25.947	4.865	AIRTEMP(W/D) 47/48F		
74.0	9.65	33.693	26.011	4.365	WIND 310/26KT WA 20		
98.0	9.00	33.913	26.288	3.082	BARO 30.36IN VIS 15MI		
198.0	8.05	34.105	26.588	2.061	SEA 310/5FT		
388.0	6.46	34.204	26.886	0.939	SWELL 310/11FT		
578.0	5.09	34.289	27.123	0.531			
773.0	4.41	34.388	27.278	0.628			
964.0	3.82	34.462	27.399	0.885			
1448.0	2.88	34.555	27.563	1.222			

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-11

LATITUDE = 36 28.8N LONGITUDE = 122 35.9W DATE FEB 27C158Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.32	33.615	25.837	6.055	I-11 31COM SST 10.3*
15.0	10.30	33.617	25.842	6.101	27 FEB 71 0158GMT
29.0	10.31	33.626*	25.848	6.075	36 28.8N 122 35.5W
48.0	10.15	33.662	25.903	5.178	AIRTEMP(W/D) 51/45F
73.0	9.21	33.854	26.208	3.110	WIND 350/26KT WA 18
97.0	8.82	33.931	26.331	3.034	BARO 30.37IN VIS 15MI
197.0	7.94	34.113	26.607	1.967	SEA 35C/3 SWELL 35C/7
381.0	6.54	34.227	26.854	0.804	BOTTLES FELCW 381M PRETRIPPED

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION I-14 LATITUDE = 35 57.1N LONGITUDE = 123 45.1W DATE FEB 25 1847Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.70*	32.897	25.034	6.509	I-14 2720M SST 11.7*
14.0	11.73	32.878	25.014	6.299	25 FEB 71 1847GMT
28.0	11.73	32.887	25.021	6.221	35 57.1N 123 45.1W
47.0	11.74	32.883	25.016	6.291	AIRTEMP(W/D) 48/54F
70.0	11.39	32.866	25.067	6.262	WIND 225/30KT WA 20
94.0	10.62	32.936	25.258	5.997	BARO 1032.0MB VIS 9MI
191.0	8.47	33.949	26.399	3.955	SEA 235/2FT
395.0	5.74	34.092	26.890	1.396	SWELL 225/13FT
590.0	4.92	34.217	27.086	1.692	
780.0	4.22	34.398	27.306	0.402	
966.0	3.70	34.430	27.385	0.591	
1463.0	2.78	34.488	27.518	0.697	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION CM LATITUDE = 36 30.2N LONGITUDE = 122 14.4W DATE MAR 040036Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.27	33.373	25.658	0.0	CM 1350M
10.0	9.69	33.365	25.749	0.0	SST: 10.08(0030); 10.28(0045);
30.0	9.59	33.423	25.810	0.0	9.83(C100)
49.0	9.50	33.536	25.513	0.0	04 MAR 71 0036GMT
74.0	9.30	33.628	26.017	0.0	36 30.2N 122 14.4W
98.0	9.08	33.759	26.155	0.0	AIRTEMP(W/C) 53/56F
156.0	8.31	34.177	26.602	0.0	WIND 325/4KT WA 00
255.0	7.19	34.208	26.750	0.0	BARO 1025.6MB VIS UNLIMITED
495.0	5.68	34.262	27.031	0.0	SEA 325/1FT
757.0	4.33	34.446	27.333	0.0	SWELL 325/3FT
558.0	3.87	34.520	27.440	0.0	
1200.0	3.31	34.570	27.535	0.0	NO OXYGEN SAMPLES

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION II-1 LATITUDE = 36 32.5N LONGITUDE = 121 57.6W DATE MAR 022349Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	II-1	8CM	SST	8.70	VIS	25
0.0	8.68	34.052	26.447	3.757	02 MAR 71	2349GMT	BARO	30.53		
10.0	8.49	34.066	26.487	2.021	36 32.5N	121 57.6W	SEA	330/.5		
20.0	8.41	34.078	26.509	3.004	AIR(W/C)	54.5/55F	SWELL	330/2		
20.0	8.35	34.091	26.529	1.745	WIND	33C/14	WA	06		
50.0	8.22	34.111	26.564	0.0	X					

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION II-2 LATITUDE = 36 31.2N LONGITUDE = 121 59.8W DATE MAR 030230Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	II-2	40CM	SST	?
0.0	9.56	33.896	26.184	0.0	X	03 MAR 71	0230GMT	
10.0	9.35	33.898	26.220	0.0	X	36 31.2N	121 59.8W	
20.0	8.92	33.977	26.351	0.0	X	AIRTEMP(W/C)	51/51.5F	
30.0	8.51	34.050	26.472	0.0	X	WIND	33C/18KT	WA 05
50.0	8.44	34.087	26.512	0.0	X	BARO	30.51IN	VIS 25MI
75.0	8.37	34.104	26.536	0.0	X	SEA	0/C	SWELL 320/3FT
100.0	8.31	34.110	26.549	0.0	X			
200.0	8.22	34.115	26.567	0.0	X			

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION II-3 LATITUDE = 36 30.1N LONGITUDE = 122 2.3W DATE MAR C30344Z

CBSERVEC VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	II-3	7COM	SST ?
0.0	9.16	33.662	26.067	0.0	03 MAR 71	0344GMT	
10.0	9.15	33.781	26.161	0.0	36 30.1N	122 02.3W	
17.0	9.14	33.823	26.195	0.0	AIRTEMP(W/D)50.0/49.5		
26.0	9.09	33.880	26.248	0.0	WIND 295/18KT WA 22		
44.0	9.14	33.989	26.325	0.0	BARO 30.50IN VIS 25MI		
67.0	8.86	34.079	26.440	0.0	SEA 0/C		
89.0	8.53	34.143	26.542	0.0	SWELL 330/3FT		
135.0	8.14	34.210	26.654	0.0			
183.0	7.97	34.232	26.696	0.0			
276.0	7.42	34.277	26.812	0.0			
275.0	6.63	34.328	26.961	0.0	NO OXYGEN SAMPLES		
474.0	5.75	34.399	27.131	0.0			

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION II-4 LATITUDE = 36 28.9N LONGITUDE = 122 4.3W DATE MAR 030559Z

CBSERVEC VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.41	33.448	25.859	6.059	II-4 83CM SST ?
9.0	9.42	33.456	25.864	5.848	03 MAR 71 0559GMT
17.5	9.33	33.564	25.963	5.659	36 28.9N 122 04.3W
26.0	9.13	33.668	26.076	4.702	AIRTEMP(W/D)50.C/49.5
43.8	9.09	33.798	26.184	4.055	WIND 320/18KT WA 32
66.0	8.81	33.977	26.368	3.369	BARO 30.51IN VIS 25MI
88.0	8.65	34.064	26.461	2.661	SEA 0/C
176.0	7.78	34.165	26.672	2.935	SWELL 33C/3FT
264.0	7.59	34.204	26.730	2.040	
443.0	6.34	34.281	26.962	1.093	
533.0	5.53	34.324	27.099	0.754	
626.8	5.01	34.363	27.191	0.532	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION II-5 LATITUDE = 36 26.9N LONGITUDE = 122 6.6W DATE MAR 03C838Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.45	33.463	25.864	0.0	II-5 1020M SST 9.45
10.0	9.45	33.476	25.875	0.0	03 MAR 71 0838GMT
20.0	9.44	33.488	25.886	0.0	36 26.9N 122 06.6W
30.0	9.26	33.578	25.985	0.0	AIRTEMP(W/C)49.0/49.0
49.0	9.25	33.784	26.147	0.0	WIND 320/18KT WA 15
98.0	8.82	34.021	26.401	0.0	BARO 30.51IN VIS 10MI
196.0	7.98	34.179	26.653	0.0	SEA 32C/2FT
295.0	7.05	34.260	26.850	0.0	SWELL 31C/6FT
475.0	5.94	34.315	27.041	0.0	
574.0	5.34	34.371	27.159	0.0	
773.0	4.57	34.424	27.289	0.0	
873.0	4.43	34.444	27.320	0.0	NO OXYGEN SAMPLES

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION II-6 LATITUDE = 36 27.3N LONGITUDE = 122 8.6W DATE MAR 031015Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	9.47	33.422	25.829	0.0
10.0	9.46	33.435	25.841	0.0
20.0	9.34	33.532	25.936	0.0
30.0	9.29	33.689	26.067	0.0
50.0	9.27	33.703	26.081	0.0
100.0	8.96	33.962	26.333	0.0
155.0	7.97	34.190	26.663	0.0
258.0	7.12	34.267	26.846	0.0
497.0	5.78	34.309	27.056	0.0
656.0	5.30	34.347	27.144	0.0
796.0	4.30	34.480	27.363	0.0
890.0	4.25	34.484	27.371	0.0

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

II-6 995M SST 9.47
 03 MAR 71 1015GMT
 36 24.4N 122 08.9W
 AIRTEMP(W/C)49.0/50.0
 WIND CCC/16KT WA 05
 BARO 30.49IN VIS 15MI
 SEA 310/2FT
 SWELL 310/LFT
 NO OXYGEN SAMPLES

STATION 11-7 LATITUDE = 36 23.7N LONGITUDE = 122 15.1W DATE MAR 031210Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.47	33.401	25.813	6.585	11-7 1225M SST 9.48
10.0	9.49	33.406	25.814	5.860	03 MAR 71 1210GMT
20.0	9.45	33.594	25.567	6.575	36 23.7N 122 15.1W
25.0	9.32	33.624*	26.011	4.985	AIRTEMP(W/D)49.0/49.0
48.0	9.23	33.692	26.079	3.513	WIND 005/18KT WA 15
95.0	8.89	33.953	26.337	2.727	BARO 30.45IN VIS 15
150.0	8.02	34.116	26.598	2.266	SEA 320/2FT
284.0	7.21	34.195	26.777	1.581	SWELL 320/5FT
473.0	6.11	34.286	26.996	0.400	
570.0	5.26	34.291	27.105	0.910	
764.0	4.50	34.403	27.280	1.205	
560.0	3.89	34.469	27.357	1.246	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION II-8 LATITUDE = 36 16.4N LONGITUDE = 122 30.8W DATE MAR 031544Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.63	33.594	25.937	0.0	II-8 2100M SST 9.60
9.0	9.60	33.597	25.944	0.0	03 MAR 71 1544GMT
29.0	9.46	33.627	25.991	0.0	AIRTEMP(W/D)52.5/53.5
48.0	9.42	33.754	26.096	0.0	WIND 335/5KT WA 02
73.0	9.18	33.873	26.228	0.0	BARO 30.46IN VIS 25MI
97.0	8.98	33.925	26.301	0.0	SEA 0/C
294.0	6.91	34.161	26.792	0.0	SWELL 28C/1FT
492.0	5.47	34.263	27.058	0.0	
792.0	4.29	34.428	27.323	0.0	
993.0	3.80	34.496	27.428	0.0	NO OXYGEN SAMPLES
1200.0	3.34	34.537	27.506	0.0	
1499.0	2.75	34.584	27.597	0.0	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION III-1 LATITUDE = 36 53.8N LONGITUDE = 122 6.2W DATE MAR 050349Z

OBSERVED VALUES

DEPTH TEMPERATURE SALINITY SIGMA-T OXYGEN

0.0	8.86	33.844	26.256	3.958	III-1 69M SST 8.89 VIS 15
10.0	8.88	33.846	26.255	3.861	05 MAR 71 0349GMT BARO 30.14
20.0	8.64	33.976	26.394	2.932	36 53.8N 122 6.2W SEA 350/1
30.0	8.55	33.988	26.417	2.450	AIR(W/C) 46/49F SWELL 020/1
50.0	8.34	33.909	26.388	2.081	WIND 000/20KT WA 02

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-2 LATITUDE = 36 52.6N LONGITUDE = 122 8.2W DATE MAR 050220Z

OBSERVED VALUES

DEPTH TEMPERATURE SALINITY SIGMA-T OXYGEN

0.0	8.55	33.819	26.216	0.0	III-2 91M SST 8.98
10.0	8.98	33.817	26.216	0.0	05 MAR 71 0220GMT
20.0	8.96	33.818	26.220	0.0	36 52.6N 122 08.2W
30.0	8.56	33.816	26.219	0.0	AIR(W/C) 53.0/58.7F BARC ?
50.0	8.88	33.859	26.265	0.0	WIND 330/15KT WA 01 VIS 20
75.0	8.30	34.054	26.507	0.0	SEA 300/3FT SWELL 330/2FT

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-3 LATITUDE = 36 51.3N LONGITUDE = 122 10.2W DATE MAR 05 0119Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	III-3	220M	SST 9.31
0.0	9.25	33.489	25.901	6.032	05 MAR 71	0119GMT	
10.0	9.25	33.490	25.902	5.817	36 51.3N	122 10.2W	
20.0	9.25	33.490	25.918	5.983			
30.0	9.18	33.505	25.941	0.0 X			
50.0	8.56	33.744	26.162	4.524	AIRTEMP(W/C)	53/59F	BARO ?
75.0	8.34	34.064	26.509	2.214	WIND 31C/16KT	WA 01	VIS 10
100.0	8.23	34.105	26.558	1.833	SEA 315/2FT		
150.0	8.02	34.119	26.600	1.776	SWELL 30C/7FT		

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-5 LATITUDE = 36 49.1N LONGITUDE = 122 15.0W DATE MAR 042148Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	9.70	33.416	25.787	0.0	III-5 1061M SST 9.68
10.0	9.65	33.412	25.792	0.0	04 MAR 71 2148GMT
30.0	9.53	33.436	25.830	0.0	36 49.1N 122 15.0W
50.0	9.21	33.562	25.980	0.0	AIRTEMP(W/C)50.0/53.9
75.0	8.90	33.697	26.135	0.0	WIND 335/18KT WA 05
100.0	8.50	33.904	26.359	0.0	BARO 31.95IN VIS 25MI
298.0	7.08	34.207	26.804	0.0	SEA 315/1FT
498.0	5.65	34.265	27.037	0.0	SWELL 300/4FT
798.0	4.40	34.410	27.297	0.0	NO OXYGEN SAMPLES

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-6 LATITUDE = 36 47.1N LONGITUDE = 122 19.1W DATE MAR 050545Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	CXYGEN	
0.0	9.78	33.475	25.820	6.614	III-6 1270M SST 9.78
8.0	9.76	33.475	25.823	9.025?	
28.0	9.75*	33.478	25.827	6.224	05 MAR 71 0545GMT
48.0	9.71	33.504	25.854	0.0 X	
71.0	9.27	33.652	26.041	5.161	36 47.1N 122 19.1W
96.0	9.12	33.723	26.121	4.950	AIRTEMP(W/C) 45.0/49.5F
180.0	7.88	34.479?	26.903	2.028	WIND C3C/2CKT WA 45
304.0	6.91	34.508?	27.065	0.104	BARO 30.18IN VIS 15MI
370.0	6.38	34.545?	27.165	0.069	SEA 350/6FT
502.0	5.42	34.551?	27.291	0.062	SWELL 230/6FT
648.0	4.80	34.557?	27.369	0.028	
882.0	4.22	34.564?	27.438	0.033	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-7 LATITUDE = 36 43.3N LONGITUDE = 122 29.0W DATE MAR 041347Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		
0.0	9.86	33.307	25.675	0.0	III-7	2200M SST 9.85
10.0	9.79*	33.309	25.689	0.0	04 MAR 71	1347GMT
30.0	9.70	33.380	25.759	0.0	36 43.3N	122 29.0W
50.0	9.65	33.412	25.792	0.0	AIRTEMP(W/C) 49/51F	
75.0	9.66	33.757	26.059	0.0	WIND 34C/18KT WA 08	
100.0	9.15	33.912	26.263	0.0	BARO 30.18IN VIS 10MI	
297.0	7.34	34.257	26.807	0.0	SEA 33C/3FT	
497.0	5.72	34.277	27.038	0.0	SWELL 31C/6FT	
797.0	4.37	34.409	27.299	0.0		
988.0	3.85	34.479	27.409	0.0		
1182.0	3.30	34.530	27.504	0.0		
1469.0	2.75	34.573	27.589	0.0	NO OXYGEN SAMPLES	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-8 LATITUDE = 36 35.3N LONGITUDE = 122 45.5W DATE MAR 040047Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	III-8	2800M	SST	10.08
0.0	10.10	33.220	25.567	6.848	04 MAR 71	0047GMT		
10.0	10.13	33.219	25.562	6.762	36 35.3N	122 45.5W		
20.0	10.05	33.223	25.578	6.887	AIRTEMP(W/C)	45/51F		
29.0	10.04	33.277	25.622	6.865	WIND	33C/18KT	WA	05
48.0	9.96	33.455	25.774	5.789	BARO	30.19IN	VIS	07MI
58.0	9.02	33.948	26.312	3.565	SEA	33C/2FT		
147.0	8.65	34.062	26.460	2.333	SWELL	31C/6FT		
196.0	8.22	34.166	26.607	1.932				
246.0	7.79	34.195	26.694	1.410				
295.0	7.32	34.267	26.818	1.306				
394.0	6.43	34.301	26.966	0.738				
494.0	5.73	34.280	27.039	0.721	BEGINNING	CF CAST #2	WA	17
792.0	4.41	34.428	27.310	0.626				
1242.0	3.30	34.573	27.538	0.987				
1491.0	2.83	34.590	27.595	1.329				

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

APPENDIX F. CRUISE V STATION DATA

STATION A LATITUDE = 36 37.3N LONGITUDE = 122 3.4W DATE JUN 271355L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	CXYGEN	
0.0	11.63	33.933	25.850	7.118	A
10.0	10.47	33.928	26.055	5.695	27 JUN 71 1355PDT
20.0	10.20	33.928	26.102	4.495	36 37.3N 122 03.4W
30.0	9.67	33.929	26.192	4.356	AIRTEMP(W/D) 56/55F
50.0	9.12	33.913	26.269	3.247	WIND 300/17KT WA 06
75.0	8.55	33.998	26.362	2.727	BARO 29.54IN
100.0	8.67*	34.035	26.435	2.310	SEA 300/2FT
200.0	8.01	34.116	26.595	1.679	SWELL 300/3FT
300.0	7.55	34.185	26.718	1.017	VIS 10MI
400.0	6.99*	34.216	26.824	0.752	
600.0	5.82	34.282	27.030	0.558	
800.0	4.67	34.408	27.265	0.359	
1000.0	3.87	34.462	27.394	0.693*	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION C LATITUDE = 36 34.8N LONGITUDE = 122 1.1W DATE JUN 27 1822Z

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.00	33.958*	25.800	7.806	C
10.0	10.38	33.925*	26.068	6.076	27 JUN 71 1822PDT
20.0	10.00	33.944	26.148	4.757	36 34.8N 122 01.1W
30.0	9.74	33.958	26.203	4.287	AIRTEMP(W/C) 58/56F
49.0	9.58	33.993	26.257	3.876	WIND 300/6KT WA 14
73.0	9.47	34.028	26.302	3.511	BARO 29.53IN
97.0	9.06*	34.005	26.350	2.902	SEA 300/2FT
196.0	8.80	34.040	26.419	2.304	SWELL 300/3FT
294.0	8.03	34.172	26.640	1.725	VIS 10MI

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-2 LATITUDE = 36 31.7N LONGITUDE = 121 59.9W DATE JUN 27 2058L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.46	33.917	26.048	5.361	11-2
10.0	10.09	33.930*	26.122	0.0 X	27 JUN 71 2058FDT
20.0	9.70	33.955	26.207	4.024	36 31.7N 121 59.9W
30.0	9.54	33.956	26.234	3.937	AIRTEMP(W/D) 60/5EF
50.0	9.31	33.960	26.275	3.619	WIND 300/5KT WA 00
75.0	9.14	34.006	26.338	2.972?	BARO 25.93IN
100.0	9.05	34.015	26.360	3.105	SEA 300/1FT
200.0	8.51	34.124	26.530	2.165	SWELL 300/2FT
200.0	7.77	34.200	26.701	1.489	VIS 10MI

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION II-3 LATITUDE = 36 30.5N LONGITUDE = 122 1.9W DATE JUN 2(2249L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.82	33.906	25.976	5.638	II-3
10.0	10.67	33.933	26.024	5.287	27 JUN 71 2249PDT
20.0	9.80	33.976	26.207	4.547	36 30.5N 122 01.9W
30.0	9.50	33.991	26.268	3.892	AIRTEMP(W/C) 54/52F
50.0	9.32	33.999	26.304	3.497	WIND 320/5KT WA 00
75.0	9.14	34.016	26.346	2.981	BARO 29.54IN
100.0	9.07	34.029	26.368	2.883	SEA 330/1FT
200.0	8.31	34.133	26.567	1.859	SWELL 300/3FT
300.0	7.85	34.195	26.685	1.325	VIS 10MI
400.0	7.29	34.201	26.770	1.132	
550.0	5.89	34.290	27.027	0.624	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-4 LATITUDE = 36 29.4N LONGITUDE = 122 4.3W DATE JUN 280126L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.79	33.958	26.022	5.322	11-4
10.0	10.62	33.951	26.047	0.0	X 28 JUN 71 3126PDT
20.0	10.61	33.945	26.044	5.353	36 29.4N 122 04.3W
30.0	10.18	33.939	26.114	4.602	AIRTEMP(W/D) 54/53F
50.0	9.19	33.968	26.301	3.102	WIND 330/12KT WA 01
75.0	9.04	34.007	26.355	2.902	BARO 29.54IN
100.0	8.91	34.049	26.409	2.557	SEA 330/2FT
200.0	8.33	34.104	26.542	1.871	SWELL 330/3FT
300.0	7.76	34.188	26.693	1.584	VIS 10MI
400.0	7.07	34.225	26.820	1.065	
525.0	6.30	34.262	26.953	0.737	
650.0	5.65	34.306	27.070	0.646	
750.0	5.07	34.398	27.212	0.0	X

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-5 - LATITUDE = 36 29.4N LONGITUDE = 122 6.0W DATE JUN 280359L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.80	33.963	26.024	5.849	11-5
10.0	9.25	33.950	26.277	4.082	28 JUN 71 0369PCT
20.0	9.12	33.976	26.318	3.372	36 29.4N 122 06.0W
30.0	8.92	33.985	26.357	3.212	AIRTEMP(W/D) 53/52F
50.0	8.79	33.993	26.384	3.232	WIND 320/14KT WA 10
75.0	8.65	33.996	26.408	3.071	BARO 25.93IN
100.0	8.55	34.106	26.510	2.450	SEA 320/2FT
200.0	8.38	34.179	26.593	2.293	SWELL 330/4FT
299.0	7.72	34.219	26.723	1.450	VIS 10MI
399.0	7.07	34.249	26.829	1.634	
549.0	6.16	34.275	26.981	0.679	
698.0	5.44	34.332	27.116	0.401	
898.0	4.43	34.454	27.328	0.785	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-6 LATITUDE = 36 29.8N LONGITUDE = 122 8.6W DATE JUN 280708L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.50	33.685	25.861	5.709	11-6
10.0	10.26	33.746	25.950	5.283	28 JUN 71 0708PDT
19.0	10.09	33.795	26.017	5.037	36 26.8N 122 08.6W
25.0	10.08	33.895	26.096	5.105	AIRTEMP(W/C) 56/54F
48.0	9.92	34.045	26.239	4.396	WIND 315/5KT WA 15
73.0	9.65	34.021	26.267	3.835	BARO 25.95IN
97.0	8.21	33.815	26.334	3.175	SEA 315/2FT
193.0	8.02	33.816	26.363	2.063	SWELL 315/4FT
290.0	7.52	33.598	26.578	1.354	VIS 10MI
385.0	7.24	34.326	26.876	1.386	
589.0	5.86	34.333	27.065	0.829	
788.0	4.84	34.414	27.251	0.609	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION II-7 LATITUDE = 36 25.4N LONGITUDE = 122 11.8W DATE JUN 280556L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.16	33.361	25.452	6.401	II-7
10.0	10.75	33.451	25.635	6.280	28 JUN 71 0956PCT
20.0	10.65	33.547	25.727	4.952?	36 25.4N 122 11.8W
30.0	10.41	33.890	26.036	5.337?	AIRTEMP(W/D) 57/56F
45.0	10.33	33.909	26.064	4.898	WIND 315/14KT WA 01
60.0	9.79	33.966	26.201	3.845	BARO 30.00IN
75.0	9.72	33.979	26.222	3.536	SEA 31C/2F1
100.0	8.65	33.971	26.388	2.760	SWELL 30C/6FT
150.0	7.92	34.051	26.562	2.493	VIS 1CM1
250.0	7.76	34.222	26.719	1.120	
400.0	6.80	34.275	26.896	0.623	
600.0	5.84	34.343	27.075	0.418	
850.0	4.43	34.450*	27.325	2.386?	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION CM LATITUDE = 36 29.6N LONGITUDE = 122 14.5W DATE JUN 281338L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.44	33.825	25.613	7.603	CM
10.0	12.29	33.813	25.632	7.300	28 JUN 71 1338PDT
19.0	10.77	33.602	25.749	5.309	36 29.6N 122 14.5W
29.0	5.43	33.421	25.835	4.375	AIRTEMP(W/C) 57/56F
43.0	9.00	33.526	25.986	4.135	WIND 315/15KT WA 16
58.0	9.03	33.633	26.065	3.828	BARO 30.03IN
71.0	5.30	33.778	26.135	3.715	SEA 315/3FT
94.0	8.86	33.937	26.329	2.812	SWELL 310/8FT
142.0	8.31	34.056	26.507	1.631	VIS 10MI
220.0	7.70	34.153	26.674	1.301	
368.0	7.00	34.233	26.836	0.835	
579.0	5.54	34.291	27.022	0.325	
778.0	4.46	34.291	27.151	0.596	
1072.0	3.81	34.446	27.387	0.748	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-8 LATITUDE = 36 24.0N LONGITUDE = 122 15.6W DATE JUN 281653L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.00	33.115	25.147	6.677	11-8
10.0	11.88	33.119	25.173	6.772	28 JUN 71 1653PDT
19.0	10.43	33.108	25.424	6.078	36 24.0N 122 15.6W
28.0	10.31	33.136	25.466	5.913	AIRTEMP(W/C) 57/56F
43.0	9.47	33.369	25.788	5.241	WIND 32C/18KT WA 20
57.0	9.53	33.540	25.911	5.106	BARO 30.02IN
71.0	9.96	33.693	25.959	5.075	SEA 320/4FT
95.0	9.43	33.900	26.209	3.614	SWELL 21C/8FT
141.0	8.05	33.977	26.484	2.764	VIS 10MI
235.0	7.55	34.134	26.681	1.591	
381.0	6.61	34.250	26.902	0.776	
576.0	5.83	34.327	27.064	0.2997	
762.0	4.97	34.336	27.174	0.585	
1056.0	3.76	34.491	27.428	0.506	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION 11-9 LATITUDE = 36 20.1N LONGITUDE = 122 23.9W DATE JUN 282023L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.68	33.180	25.067	6.648	11-9
8.0	12.68	33.179	25.067	6.697	28 JUN 71 2023PDT
17.0	12.67	33.177	25.067	6.664	36 20.1N 122 23.9W
25.0	12.30	33.212	25.165	6.666	AIRTEMP(W/D) 55/54F
38.0	10.40	33.308	25.585	6.160	WIND 320/22KT WA 30
52.0	9.32	33.407	25.842	5.264	BARO 30.02IN
65.0	8.55	33.507*	25.973	4.851	SEA 320/4FT
84.0	8.54	33.699*	26.130	3.807	SWELL 310/8FT
126.0	8.34	33.508	26.387	3.128	VIS 10MI
209.0	7.48	34.032	26.611	2.296	
335.0	6.18	34.183	26.906	1.325	
503.0	5.71	34.255	27.025	0.529	
675.0	4.51	34.354	27.195	0.262	
1140.0	3.71	34.482	27.426	0.599	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 11-10A LATITUDE = 36 16.0N LONGITUDE = 122 31.1W DATE JUN 290218L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.15	33.075	24.854	6.179	11-10A
9.0	13.15	33.086	24.902	6.108	29 JUN 71 0218PDT
18.0	12.94	33.095	24.951	6.213	36 16.0N 122 31.1W
27.0	10.20	33.117	25.453	5.847	AIRTEMP(W/C) 54/53F
42.0	10.51	33.380	25.622	5.843	WIND 32C/18KT WA 04
55.0	9.20	33.471	25.911	4.607	BARO 30.03IN
70.0	9.14	33.768	26.153	3.596	SEA 320/4FT
93.0	8.57	33.803	26.269	3.464	SWELL 310/8FT
142.0	7.51	33.963	26.454	3.119	VIS 10MI

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NC VALUE

STATION I-13STD LATITUDE = 36 27.2N LONGITUDE = 122 37.0W DATE JUN 290500L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.75	33.030	24.938	0.0	I-13STD
10.0	12.12	33.100	25.113	0.0	29 JUN 71 0500PDT
20.0	10.65	33.150	25.419	0.0	36 27.2N 122 37.0W
30.0	11.12	33.540	25.638	0.0	AIRTEMP(W/D) 52/53.5F
50.0	9.15	33.400	25.864	0.0	WIND 320/22KT
75.0	8.75	33.680	26.145	0.0	BARO 30.02IN
100.0	8.45	33.830	26.309	0.0	SEA 32C/5FT
150.0	7.80	33.970	26.516	0.0	SWELL 310/8FT
200.0	7.40	34.040	26.628	0.0	VIS 10MI
250.0	6.87	34.070	26.726	0.0	
300.0	6.50	34.120	26.815	0.0	
400.0	6.25	34.170	26.887	0.0	
500.0	5.52	34.290	27.073	0.0	
600.0	5.08	34.350	27.173	0.0	
800.0	4.45	34.450	27.323	0.0	
1000.0	3.88	34.500	27.423	0.0	
1200.0	3.34	34.540	27.508	0.0	
1400.0	2.92	34.580	27.579	0.0	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-12 LATITUDE = 36 30.5N LONGITUDE = 122 28.2W DATE JUN 29 1140L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0*	11.27	33.233	25.373	6.345?	I-12
6.0*	11.27	33.233	25.373	6.536	29 JUN 71 1140PDT
14.0*	10.86	33.257	25.465	6.263	36 30.5N 122 28.2W
20.0*	10.26	33.372	25.659	5.718	AIRTEMP(W/C) 56/55F
36.0*	9.41	33.440?	25.853	4.640	WIND 32C/14KT WA 40
72.0*	8.88	33.681	26.126	4.212	BARO 30.08IN
108.0*	8.40	33.912	26.381	3.091	SEA 320/4FT
146.0*	8.27	34.056	26.513	2.119	SWELL 32C/8FT
182.0*	7.98	34.096	26.588	1.871	VIS 8MI
220.0*	7.33	34.162	26.734	1.860	
360.0*	6.70	34.260	26.898	0.560?	
402.0*	6.02	34.280*	27.003	0.873?	
662.0*	5.22	34.380*	27.180	3.244?	
1160.0*	3.54	34.530*	27.481	0.656	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-11 LATITUDE = 36 34.0N LONGITUDE = 122 20.1W DATE JUN 29 1405L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.55	33.804	25.757	6.898	I-11
9.0	11.37	33.735	25.744	6.711	29 JUN 71 1405PDT
18.0	11.08	33.693	25.764	6.375	36 34.0N 122 20.1W
27.0	9.56	33.564	25.925	4.817	AIRTEMP(W/C) 57/56F
46.0	10.57	33.939	26.046	5.245?	WIND 32C/16KT WA 25
68.0	8.75	33.817	26.252	3.546	BARO 30.07IN
90.0	8.81	33.938	26.338	3.014	SEA 330/4FT
180.0	7.93	34.096	26.555	2.121	SWELL 32C/8FT
269.0	7.25	34.168	26.750	1.129	VIS 8MI
258.0	6.68	34.225*	26.873	0.838	
544.0	5.88	34.328	27.058	0.338	
839.0	4.65	34.427	27.283	0.265	
1023.0	3.94	34.490*	27.409	2.364?	NOTE: SALINITIES ARE
1417.0	2.89	34.553	27.560	1.007?	AVERAGES OF 2 OR 3 RUNS

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-10 LATITUDE = 36 37.0N LONGITUDE = 122 15.9W DATE JUN 251827L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.33	33.616	25.659	7.061	I-10
9.0	11.38	33.603	25.640	6.434	29 JUN 71 1827PCT
18.0	9.90	33.364	25.713	4.906	36 37.0N 122 15.9W
27.0	9.70	33.529	25.875	4.248	AIRTEMP(W/D) 56/54F
37.0	10.73	33.835	25.937	5.667	WIND 300/20KT WA 17
47.0	8.88	33.470	25.961	4.488	BARO 29.95IN
71.0	8.91	34.053	26.412	3.470	SEA 300/3FT
94.0	8.97	34.161	26.487	2.304	SWELL 310/7FT
141.0	7.97	34.150	26.632	2.589	VIS 8MI
236.0	7.45	34.224	26.766	1.803	
425.0	6.65	34.371	26.987	0.481	
666.0	5.31	34.420	27.201	0.250	
965.0	4.06	34.503	27.407	0.387	
1264.0	3.21	34.554	27.532	0.642	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION E LATITUDE = 36 33.5N LONGITUDE = 122 12.2W DATE JUN 292018L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.04	33.180	25.373	5.231	E
8.0	11.03	33.185	25.379	6.467	29 JUN 71 2018PDT
16.0	10.73	33.186	25.433	6.185	36 33.5N 122 12.2W
25.0	9.65	33.366	25.756	5.324	AIRTEMP(W/C) 55/54F
32.0	9.28	33.417	25.856	4.567	WIND 22C/22KT WA 30
41.0	10.27	33.791	25.583	5.026	BARO 30.02IN
58.0	9.75	33.927	26.177	4.181	SEA 32C/4FT
84.0	8.74	33.893	26.313	3.281	SWELL 22C/7FT
128.0	8.17	33.970	26.461	2.884	VIS 8MI
218.0	7.87	34.188	26.676	1.453	
400.0	6.96	34.262	26.864	0.783	
636.0	5.65	34.334	27.087	0.285	
524.0	4.29	34.335	27.249	0.890	
1215.0	3.42	34.533	27.455	0.674	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION F LATITUDE = 36 34.5N LONGITUDE = 122 10.0W DATE JUN 300224L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.83	33.472	25.637	6.286	F
9.0	10.78	33.476	25.649	6.726	30 JUN 71 0224PDT
19.0	9.55	33.477	25.859	5.249	36 34.5N 122 10.0W
28.0	9.29	33.500	25.919	4.768	AIRTEMP(W/D) 53/52F
38.0	10.29	33.751	25.948	5.407	WIND 32C/16KT WA 22
45.0	10.36	33.838	26.004	5.157	BARO 30.01IN
68.0	9.24	33.866	26.213	3.893	SEA 32C/4FT
90.0	8.51	33.940	26.386	2.866	SWELL CI//6FT
135.0	8.50	34.056	26.478	2.181	VIS 10MI
225.0	7.97*	34.206	26.676	1.321	
410.0	6.98	34.273	26.870	0.731	
643.0	5.65	34.343	27.099	0.456	
922.0	4.16	34.299	27.234	0.556	
1200.0*	3.23	34.530	27.501	0.878	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION · G

LATITUDE = 36 35.2N LCNGITUDE = 122 7.6W DATE JUN 300416L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	10.97	33.420	25.572	6.506
10.0	10.73	33.505	25.681	6.462
19.0	9.33	33.587	25.981	4.833
29.0	9.66	33.691	26.008	4.871
38.0	10.29	33.888	26.055	4.916
47.0	9.78	33.904	26.154	4.335
93.0	8.56	33.973	26.404	2.822
136.0	8.57	34.248	26.618	2.226
176.0	8.28	34.276	26.684	1.582
360.0	7.98	34.225	26.768	1.358
429.0	6.86	34.408	26.953	0.763
622.0	5.65	34.328	27.087	0.496
712.0	4.70	34.325	27.156	0.958
1103.0	3.74	34.495	27.433	0.702

G

30 JUN 71 0416PCT

36 35.2N 122 07.6W

AIRTEMP(W/D) 54/53F

WIND 320/13KT WA 15

BARO 24.98IN

SEA 320/3FT

SWELL 320/5FT

VIS 10MI

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION H LATITUDE = 36 36.3N LONGITUDE = 122 6.0W DATE JUN 300634L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	H
0.0	11.91	33.829	25.717	6.834	30 JUN 71 0634PCT
9.0	11.89	33.910	25.784	7.007	36 36.3N 122 06.0W
15.0	9.41	33.608	25.984	4.817	AIRTEMP(W/D) 53/52F
38.0	9.98	33.903	26.120	4.522	WIND 320/11KT WA 15
47.0	9.71	33.578	26.223	4.156	BARO 30.00IN
71.0	8.67	33.994	26.403	2.818	SEA 32C/CFI
95.0	8.65	33.998	26.410	2.643	SWELL 32//5FT
143.0	8.53	34.063	26.479	2.257	VIS 10MI
190.0	8.20	34.149	26.597	1.696	
286.0	7.88	34.204	26.688	1.316	
479.0	6.46	34.258	26.929	0.716	
672.0	5.36	34.336	27.129	0.387	
1064.0	3.79	34.474	27.411	0.643	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION A' LATITUDE = 36 37.1N LONGITUDE = 122 3.9W DATE JUN 300943L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.75	33.838	25.936	6.273	A'
10.0	10.76	33.847	25.941	6.357	30 JUN 71 0943PDT
20.0	10.76	33.940	26.013	5.948	36 37.1N 122 03.9W
30.0	9.83	33.830	26.088	4.498	AIRTEMP(W/C) 54/52F
40.0	9.76	33.928	26.176	4.081	WIND ??? WA 07
49.0	9.71	33.971	26.218	3.908	BARO 30.02IN
74.0	8.50	33.944	26.390	3.001	SEA 300/1FT
99.0	8.64	34.052	26.453	2.332	SWELL 300/5FT
149.0	8.49	34.087	26.504	2.215	VIS 8MI
247.0	8.23	34.171	26.609	1.580	
391.0	7.01	34.238	26.839	0.971	
550.0	5.72	34.304	27.059	0.464	
790.0	4.81	34.259	27.132	0.781	
890.0	4.32	34.422	27.315	0.583	

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NO VALUE

STATION I-9 LATITUDE = 36 40.4N LONGITUDE = 122 5.0W DATE JUN 301133L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.04	33.584	25.687	5.625	I-9 .
10.0	11.13	33.637	25.712	5.999	30 JUN 71 1133POT
15.0	11.12	33.639	25.715	6.324	36 40.4N 122 09.0W
20.0	10.85	33.693	25.805	4.015	AIRTEMP(W/C) 56/54F
30.0	9.27	33.480	25.907	4.365	WIND 32C/1CKT WA 06
45.0	9.20	33.727	26.111	2.808	BARO 30.03IN
60.0	9.75	34.035	26.254	2.503	SEA 32C/2FT
75.0	9.17	33.955	26.254	2.802	SWELL 30C/5FT
100.0	8.35	33.943	26.407	1.672	VIS 8MI
150.0	7.81	34.000	26.538	1.802	
250.0	7.85	34.026	26.552	1.113	
400.0	7.11	34.220	26.811	0.679	
600.0	5.74	34.232	27.000	0.639	
850.0	4.53	34.408	27.281	0.339	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-8 LATITUDE = 36 41.4N LONGITUDE = 122 5.5W DATE JUN 30 1351L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.58	33.479	25.433	7.067	I-8
10.0	11.54	33.414	25.464	6.804	30 JUN 71 1351PCT
19.0	9.46	33.484	25.879	4.976	36 41.4N 122 05.5W
29.0	9.22	33.551	25.970	4.586	AIRTEMP(W/C) 56/55F
38.0	9.54	33.736	26.063	4.493	WIND 31C/17KT WA 15
48.0	9.88	33.903	26.136	4.305	BARO 30.01IN
67.0	8.79	33.871	26.288	3.483	SEA 31C/3FT
96.0	8.40	33.987	26.439	2.546	SWELL 31C/7FT
143.0	8.19	34.090	26.552	2.257	VIS 8MI
239.0	8.10	34.190	26.644	1.344	
334.0	7.62	34.220*	26.738	1.174	
477.0	6.61	34.250*	26.902	0.888	
768.0	4.70	34.300*	27.176	0.503	
1065.0	3.79	34.482	27.418	0.697	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-6 LATITUDE = 36 43.5N LONGITUDE = 122 0.1W DATE JUN 30 1721L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.55	33.884	26.000	6.244	I-6.
9.0	10.52	33.883	26.011	6.204	30 JUN 71 1721PCT
18.0	10.24	33.882	26.059	5.347	36 43.5N 122 00.1W
27.0	9.82	33.938	26.174	4.290	AIRTEMP(W/C) 56/54F
45.0	9.42	33.972	26.266	3.538	WIND 300/20KT WA 26
67.0	9.32	34.010	26.312	3.128	BARO 25.98IN
89.0	9.24	34.015	26.329	2.982	SEA 300/2FT
133.0	8.60	34.057	26.463	2.223	SWELL 210/7FT
172.0	8.42	34.081	26.510	2.121	VIS 8MI
256.0	7.97	34.157	26.637	1.575	
346.0	7.26	34.198	26.772	1.376	
538.0	6.09	34.276	26.991	0.603	
637.0	5.56	34.303	27.078	0.606	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION I-2 LATITUDE = 36 47.7N LONGITUDE = 121 51.6W DATE JUN 302043L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.61	33.969	25.491	8.269	I-2
10.0	13.19	33.964	25.572	8.418	30 JUN 71 2043PCT
20.0	9.89	33.953	26.174	4.162	36 47.7N 121 51.6W
30.0	9.50	33.969	26.251	3.517	AIRTEMP(W/D) 55/54F
50.0	9.12	33.983	26.324	3.092	WIND 285/18KT WA 05
75.0	8.88	34.020	26.391	2.341	BARO 29.95IN
100.0	8.81	34.037	26.415	2.271	SEA 285/2FT
150.0	8.43	34.097	26.521	1.921	SWELL 310/6FT
200.0	8.22	34.082	26.541	1.883	VIS 8MI
244.0	8.01	34.120	26.602	1.633	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION I-3 LATITUDE = 36 47.3N LONGITUDE = 121 53.9W DATE JUN 302136L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.47	33.781*	25.762	6.571	I-3 (BAD SALINITIES)
10.0	10.82	33.871*	25.949	6.087	30 JUN 71 2136PDT
20.0	9.68	33.971*	26.223	4.247	36 47.3N 121 53.9W
30.0	9.35	33.979*	26.277	3.758	AIRTEMP(W/C) 54/53F
50.0	9.18	33.994*	26.323	3.192	WIND 25C/18KT WA 02
75.0	8.96	34.047*	26.399	2.747	BARO 29.56IN
100.0	8.78	34.067*	26.443	2.264	SEA 28C/2FT
150.0	8.47	34.104*	26.520	2.072	SWELL 21C/5FT
200.0	8.28	34.134?	26.573	1.981	VIS 8MI
248.0	7.85	34.171?	26.660	0.0	X

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION I-4 LATITUDE = 36 45.9N LONGITUDE = 121 55.8W DATE JUN 30 2251L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.97	33.941	25.977	5.605	I-4
10.0	10.75	33.903	25.986	5.781	30 JUN 71 2251PCT
20.0	9.74	33.820	26.095	4.537	36 45.9N 121 55.8W
30.0	9.03	33.843	26.229	3.625	AIRTEMP(W/D) 53/52.5F
50.0	9.00	34.117	26.447	3.226	WIND 305/18KT WA 10
74.0	8.58	34.031	26.383	2.695	BARO 25.96IN
98.0	8.85	34.017	26.353	2.341	SEA 300/3FT
117.0	8.67	34.052	26.449	2.178	SWELL 310/5FT VIS 8MI

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION I-5 LATITUDE = 36 45.2N LONGITUDE = 121 58.3W DATE JUL 010006L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.76	33.931	26.006	5.939	I-5
10.0	10.76	33.933	26.008	6.070	01 JUL 71 0006FDT
20.0	10.65	33.911	26.010	5.876	36 45.2N 121 58.3W
30.0	10.16	33.927	26.108	5.027	AIRTEMP(W/D) 53/52F
50.0	9.21	33.983	26.309	3.500	WIND 320/18KT WA 05
75.0	9.21	34.018	26.337	3.075	BARO 29.56IN
100.0	9.13	34.029	26.358	2.776	SEA 32C/3FT
125.0	9.05	34.034	26.375	2.981	SWELL 31C/6FT VIS 8MI

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION	III-2	LATITUDE = 36 52.8N	LONGITUDE = 122	8.5W	DATE	JUL 010159L
OBSERVED VALUES						
DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		
0.0	10.95	33.974	26.006	8.653	III-2 01 JUL 71 0159PDT	
10.0	10.93	33.976	26.011	8.610	36 52.8N 122 08.5W	
20.0	10.81	33.962*	26.022	8.572	AIRTEMP(W/C) 53/52F	
30.0	9.66	33.915	26.183	6.567	WIND 32C/12KT BAR 29.95	
50.0	8.71	33.977	26.384	4.206	SEA 32C/3FT WA 02	
70.0	8.76	34.056*	26.438	3.353	SWELL 310/6FT VIS 10MI	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION III-3 LATITUDE = 36 51.9N LONGITUDE = 122 10.7W DATE JUL 01C253L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	III-3 01 JUL 71 0253PDT 36 51.9N 122 10.7W AIRTEMP(W/C) 52.5/51.5F WIND 315/12KT WA 05 BARO 29.55IN SEA 315/3FT SWELL 31C/6FT VIS 10MI
0.0	10.73	33.950	26.026	8.915	
10.0	10.78	33.947	26.015	8.999	
20.0	10.74	33.944	26.020	8.851	
30.0	10.21	33.867	26.052	6.052	
40.0	9.66	33.971	26.226	4.887	
50.0	9.06	33.943	26.302	4.685	
60.0	8.67	33.955	26.373	3.573	
75.0	8.82	34.027	26.406	3.420	
110.0	8.71	34.058	26.447	3.507	

INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION III-4 LATITUDE = 36 50.9N LONGITUDE = 122 12.5W DATE JUL 010354L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	10.52	33.849	25.583	7.241	III-4
10.0	10.52	33.848	25.982	7.626	01 JUL 71 0354PDT
20.0	9.34	33.739*	26.098	5.703	36 50.9N 122 12.5W
30.0	9.16	33.833	26.200	5.207	AIRTEMP(W/C) 52/51F
49.0	9.24	33.898	26.238	4.528	WIND 210/12KT WA 10
59.0	8.99	33.924	26.258	4.103	BARO 29.94IN
79.0	8.79	33.937	26.340	4.265	SEA 31C/3FT
123.0	8.30	34.011	26.473	3.372	SWELL 21C/6FT
197.0	8.03	34.136	26.612	2.352	VIS 10MI
246.0	7.26	34.109	26.702	2.399	
346.0	7.13	34.226	26.812	1.313	
545.0	5.89	34.295	27.031	0.712	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION III-5 LATITUDE = 36 50.0N LONGITUDE = 122 14.1W DATE JUL 010602L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	III-5 01 JUL 71 0602PDT 36 50.0N 122 14.1W AIRTEMP(W/C) 54/53F WIND 32C/16KT WA 1C BARO 25.94IN SEA 32C/3FT SWEL 31C/6FT VIS 10 MI
0.0	11.24	33.827	25.839	4.130	
15.0	11.26	33.833	25.840	4.257	
25.0	10.85	33.865	25.939	3.347	
35.0	9.97	33.912	26.128	2.953	
49.0	8.99	33.788	26.192	2.663	
59.0	8.95	33.890	26.278	2.640*	
74.0	9.00	33.964	26.328	2.599	
99.0	8.57	33.945	26.380	1.881?	
148.0	7.99	34.024	26.530	2.362?	
198.0	7.90	34.118	26.617	1.220	
248.0	7.59	34.187	26.717	1.082	
348.0	7.19	34.234	26.810	0.587	
498.0	6.37	34.219	26.910	0.675	
698.0	5.19	34.361	27.168	0.251	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION III-6 LATITUDE = 36 47.8N LONGITUDE = 122 18.2W DATE JUL 01C846L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.10	33.872	25.900	6.746
15.0	11.10	33.872	25.900	6.767
25.0	10.31	33.901	26.062	5.067
39.0	9.69	33.942	26.159	4.125
49.0	9.45	33.962	26.247	3.785
73.0	9.04	34.019	26.365	2.882
98.0	8.55	33.995	26.423	2.615
146.0	8.15	34.068	26.535	2.414
195.0	7.85	34.105	26.608	2.383
292.0	7.41	34.213	26.763	1.176
391.0	6.57	34.216	26.827	1.150
550.0	5.67	34.330	27.086	0.416
789.0	4.77	34.400*	27.248	0.0 X

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

III-6

01 JUL 71 0846PCT

36 47.8N 122 18.2W

AIRTEMP(W/D) 53.5/52.5F

WIND 320/15KT WA 10

BARO 29.53IN

SEA 320/3FT

SWELL 310/6FT

VIS 9MI

STATION J LATITUDE = 36 44.3N LONGITUDE = 122 18.1W DATE JUL 011050L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.32	33.820*	25.819	6.420	J
15.0	11.28	33.828	25.833	6.437	01 JUL 71 1050PCT
24.0	11.28	33.827	25.832	6.442	36 44.3N 122 18.1W
39.0	10.49	33.913	26.040	5.233	AIRTEMP(W/D) 54/53F
49.0	10.32	33.528	26.081	5.007	WIND 320/14KT WA 08
73.0	8.76	33.800	26.238	3.644	BARO 25.52IN
97.0	8.62	33.909	26.345	3.131	SEA 320/3FT
146.0	8.03	34.004	26.509	3.128	SWELL 310/6FT
193.0	7.51	34.115	26.613	1.998	VIS 8MI
290.0	6.57*	34.157	26.780	1.325	
390.0	6.75	34.269	26.858	0.744	
554.0	5.72	34.324	27.075	0.419	
796.0	4.69	34.333	27.204	0.449	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION K LATITUDE = 36 43.2N LONGITUDE = 122 19.0W DATE JUL 011255L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.46	33.763	25.750	6.757	K
15.0	11.43	33.765	25.757	6.961	01 JUL 71 1255PDT
25.0	11.40	33.787	25.779	6.621	36 43.2N 122 19.0W
40.0	11.37	33.772	25.773	6.604	AIRTEMP(W/D) 55/54F
50.0	10.50	33.899	26.027	5.259	WIND 315/16KT WA 05
60.0	10.26	33.914	26.080	4.801	BARO 29.93IN
75.0	8.63	33.770	26.234	3.643	SEA 315/3FT
100.0	8.59	33.936	26.370	2.989	SWELL 310/7FT
150.0	7.99	33.976	26.493	2.750	VIS 8MI
200.0	7.55	33.983	26.562	2.752	
300.0	7.06	34.196	26.799	1.263	
400.0	6.69	34.279	26.914	0.796	
600.0	5.49	34.322	27.102	0.431	
800.0	4.72	34.389	27.245	0.574	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION. L LATITUDE = 36 42.1N LONGITUDE = 122 21.7W DATE JUL 011448L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.38	33.254	25.369	6.499
10.0	11.32	33.241	25.370	6.556
19.0	11.10	33.529	25.633	6.363
29.0	9.70	33.360	25.743	5.546
38.0	9.16	33.392*	25.856	5.493
48.0	9.07	33.423	25.894	4.881
58.0	9.02	33.511	25.971	4.544
87.0	8.71	33.761	26.215	3.567
120.0	8.73	33.973	26.378	2.621
194.0	7.55	34.044	26.610	0.238
267.0	6.97	34.064	26.707	1.772
336.0	6.78	34.195	26.836	0.807
534.0	5.84	34.337	27.071	0.406
778.0	4.78	34.349	27.206	0.380

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

L
 01 JUL 71 1448PCT
 36 42.1N 122 21.7W
 AIRTEMP(W/D) 56/55F
 WIND 310/20KT WA 15
 BARO 25.93IN
 SEA 31C/3FT
 SWELL 31C/8FT
 VIS 8MI
 J

NOTE: TEMPERATURE AND
 ARE HIGHLY VARIABLE I
 100M DEPTH (FROM SV/T

STATION. M LATITUDE = 36 40.6N LONGITUDE = 122 24.0W DATE JUL 011703L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.01	33.180	25.196	6.437	M
9.0	12.00	33.175	25.194	6.609	01 JUL 71 1703PDT
18.0	10.84	33.089	25.338	6.270	36 40.6N U11 IJ.0h
28.0	10.23	33.364	25.657	6.122	AIRTEMP(W/D) 55.5/54.5F
37.0	10.22	33.467	25.739	5.771	WIND 31C/22KT WA 15
46.0	9.49	33.553	25.528	5.180	BARO 29.53IN
65.0	8.50	33.704	26.141	3.997	SEA 31C/4FT
92.0	8.52	33.868	26.328	3.439	SWELL 31C/8FT
138.0	8.18	34.029	26.506	5.889?	VIS 8MI
223.0	7.17	34.070	26.684	2.090	
330.0	6.70	34.201	26.852	3.121	
477.0	6.18	34.311	27.007	0.504	
677.0	5.26	34.368	27.166	0.376	
877.0	4.40	34.431	27.313	0.475	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION: N LATITUDE = 36 40.1N LONGITUDE = 122 27.1W DATE JUL 011853L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.11	33.174	25.172	6.533	N
9.0	12.10	33.174	25.174	6.558	01 JUL 71 1853PCT
18.0	11.37	33.135	25.279	6.415	36 40.1N 122 27.1W
27.0	10.73	33.472	25.655	6.089	AIRTEMP(W/C) 54.5/53.KF
36.0	9.54	33.372	25.779	5.349	WIND 31C/21KT WA 20
45.0	9.55	33.453	25.840	5.248	BARO 25.53IN
63.0	9.04	33.589	26.029	4.687	SEA 31C/4FT
92.0	8.56	33.861	26.316	0.0	SWELL 31C/8FT
138.0	8.27	34.029	26.492	2.565	VIS 8MI
232.0	7.15	34.099	26.710	1.882	
372.0	6.56	34.227	26.891	0.886	
561.0	5.77	34.337	27.079	0.394	
867.0	4.54	34.427	27.295	0.486	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION III-7 LATITUDE = 36 42.8N LONGITUDE = 122 28.5W DATE JUL 012109L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	CXYGEN	
0.0	11.25	33.416	25.519	5.104	III-7
10.0	11.17	33.457	25.565	4.168	01 JUL 71 2109PDT
20.0	9.97	33.420	25.745	3.793	36 42.8N 122 28.5W
29.0	9.33	33.396	25.832	3.687	AIRTEMP(W/D) 54/53F
39.0	9.08	33.490	25.945	2.757	WIND 310/18KT WA 15
49.0	9.13	33.597	26.021	2.700	BARO 29.53IN
58.0	8.94	33.680	26.116	3.072	SEA 31C/4FT
73.0	8.65	33.738	26.206	2.480	SWELL 31C/8FT
97.0	8.51	33.898	26.353	2.084	VIS 8MI
146.0	8.35	34.070	26.512	1.519	
291.0	7.14	34.213	26.801	0.657	
535.0	5.72	34.303	27.059	0.240	
777.0	4.72	34.399	27.253	0.258	
958.0	3.93	34.469	27.393	0.378	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION: III-8 LATITUDE = 36 39.5N LONGITUDE = 122 35.8W DATE JUL 012336L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	III-8 01 JUL 71 2336PDT 36 39.5N 122 35.8W AIRTEMP(W/D) 54/53F WIND 32C/1JKT WA 12 BARO 29.54IN SEA 32C/4FT SWELL 21C/8FT VIS 7MI
0.0	11.56	33.253	25.262	8.051?	
10.0	11.97	33.251	25.258	6.455	
20.0	11.78	33.267	25.306	6.409	
30.0	10.54	33.400	25.632	5.988	
49.0	9.07	33.754	26.153	5.163	
74.0	8.82	33.969*	26.360	3.684	
58.0	8.36	33.999	26.455	3.216	
147.0	7.94	34.012	26.528	2.617	
196.0	7.42	34.061	26.642	2.100	
270.0	6.56	34.153	26.779	1.326	
343.0	6.80	34.248	26.875	0.754	
490.0	5.55	34.322	27.045	0.432	
725.0	4.88	34.395	27.231	0.372	
1030.0	3.86	34.475	27.408	0.609	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATIDN III-9 LATITUDE = 36 35.7N LONGITUDE = 122 44.4W DATE JUL 020133L

CBSERVEC VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.80	33.333	25.353	6.437	III-9
5.0	11.81	33.334	25.352	6.504	02 JUL 71 0133PDT
20.0	10.91	33.426	25.587	6.298	36 35.7N 122 44.4W
39.0	9.88	33.500	25.822	5.380	AIRTEMP(W/C) 54/53F
59.0	9.00	33.632	26.069	4.147	WIND 320/28KT WA 08
98.0	8.49	33.880	26.342	3.339	BARO 29.93IN
146.0	8.11	34.055	26.537	2.339	SEA 320/4FT
195.0	7.56	34.072	26.631	2.286	SWELL 210/6FT
292.0	6.69	34.158	26.819	1.437	VIS 8MI
487.0	5.76	34.335	27.076	0.430	
784.0	4.58	34.452	27.310	0.365	
1179.0	3.52	34.528	27.481	0.751	
1565.0	2.68	34.601	27.617	1.210	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 0 LATITUDE = 36 36.5N LONGITUDE = 122 27.6W DATE JUL 020506L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
0.0	11.65	33.239	25.308	6.418
9.0	11.64	33.251	25.319	6.462
23.0	10.70	33.538	25.711	6.117
45.0	10.07	33.682	25.932	5.567
73.0	9.13	33.759	26.147	3.966
91.0	8.28	34.009	26.318	3.644
138.0	8.41	34.105	26.530	2.744
179.0	7.84	34.143	26.646	2.568
251.0	6.96	34.224	26.834	1.697
445.0	6.21	34.441	27.105	0.575
844.0	4.47	34.584	27.427	0.428
1238.0	3.36	34.650	27.594	0.877

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

0
 02 JUL 71 0506PDT
 36 36.5N 122 27.6W
 AIRTEMP(W/C) 53/54F
 WIND 32C/15KT WA 25
 BARO 29.93IN
 SEA 32C/4FT
 SWELL 31C/8FT
 VIS 8MI

STATION "I-10" LATITUDE = 36 36.8N LONGITUDE = 122 15.9W DATE JUL 020722L

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.42	33.314	25.409	6.434	"I-10"
9.0	11.40	33.302	25.403	6.527	02 JUL 71 0722PCT
18.0	10.57	33.608	25.789	6.146	36 36.8N 122 15.5W
36.0	9.58	33.661	25.998	0.0 X	AIRTEMP(W/D) 55/54F
54.0	10.08	33.854	26.064	5.105	WIND 320CI2KT WA 30
90.0	9.48	33.928	26.222	3.714	BARO 25.54IN
126.0	8.79	34.002	26.351	2.582	SEA 32C/4FT
180.0	8.38	34.055	26.456	2.524	SWELL310/8FT
270.0	7.42	34.170	26.728	1.634	VIS 8MI
459.0	6.49	34.266	26.931	0.666	
747.0	5.16	34.366	27.176	0.388	
1095.0	3.70	34.487	27.431	0.712	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION A" LATITUDE = 36 37.1N LONGITUDE = 122 3.6W DATE JUL 020537L

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	A"
0.0	10.56	33.411	25.637	6.233	02 JUL 71 0937PCT
10.0	10.86	33.509	25.661	6.260	36 37.1N 122 03.6W
20.0	10.24	33.489	25.753	5.023	AIRTEMP(W/C) 58/57F
25.0	10.41	33.801	25.967	4.568	WIND 310/8KT WA 10
29.0	10.25	33.867	26.046	4.576	BARO 29.98IN
44.0	9.52	33.864	26.166	3.506	SEA 31C/2FT
74.0	8.88	33.912	26.306	2.703	SWELL 31C/6FT
98.0	8.71	33.911	26.332	3.153?	VIS 7MI
147.0	8.50*	34.037	26.463	2.312	
292.0	7.81	34.203	26.657	1.174	
482.0	6.47	34.266	26.934	0.614	
825.0	4.57	34.418	27.284	0.450	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE



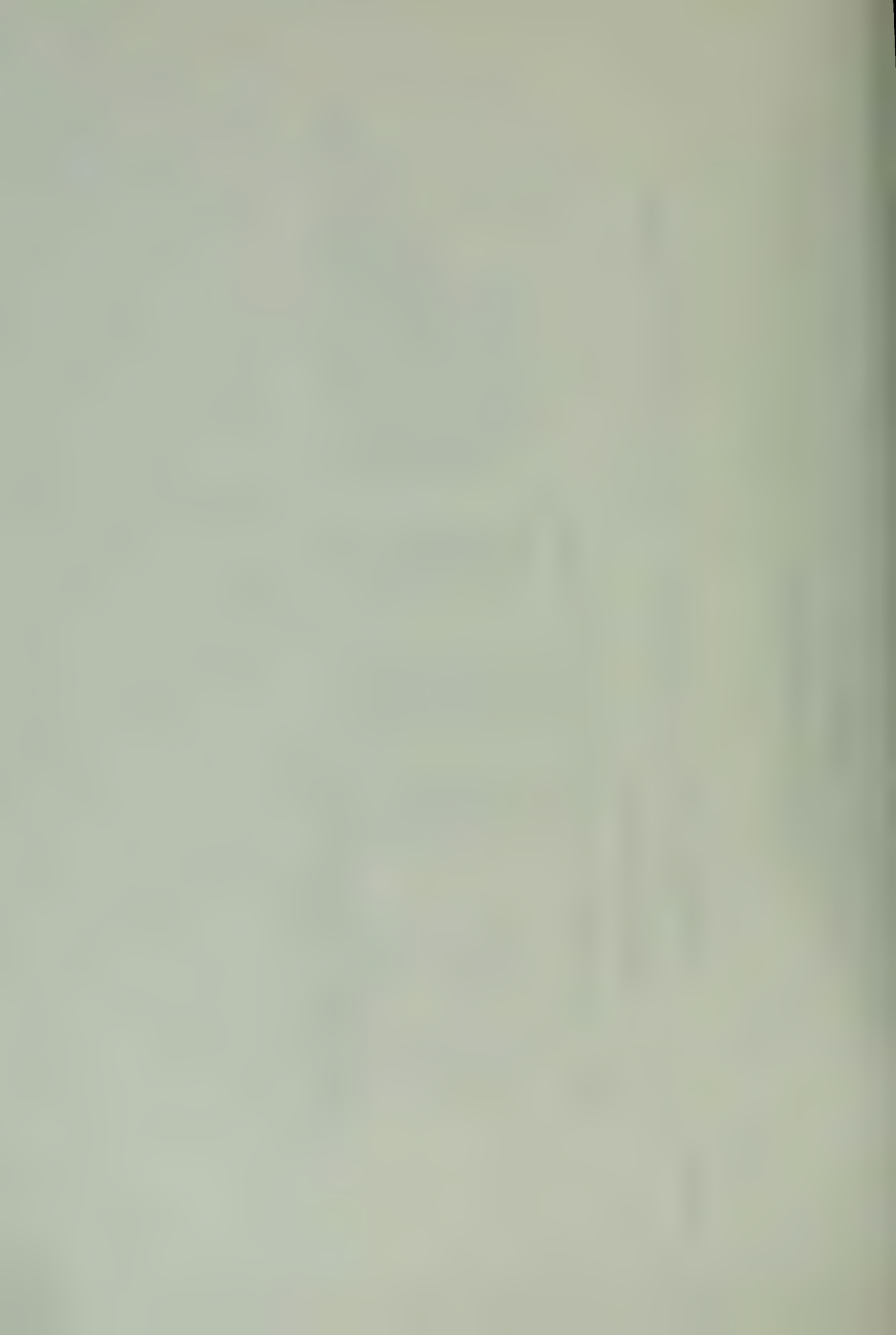
APPENDIX G
CRUISE VI STATION DATA

STATION 1 LATITUDE = 37 2.4N LONGITUDE = 122 15.2W DATE 10 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 2000 PCT
0.0	14.59	33.932	25.257	6.540	WIND 30C/5
5.0	14.64	34.110	25.383	7.790	BARO 25.87 IN
10.0	12.99	34.266	25.846	7.860	TEMP 58 CE/55 WB
15.0	11.07	34.426	26.336	5.080	CLOUD ST 10/10 VIS 2 NM
20.0	10.48	34.567	26.550	3.770	SEA 30C/1 FT SWELL 300/2 FT
25.0	10.00	34.737	26.766	3.260	

INDICATES ADJUSTED VALUE
? INDICATES QUESTIONABLE VALUE
X INDICATES NO VALUE



STATION

2 LATITUDE = 37 1.0N LONGITUDE = 122 18.1W DATE 10 AUG 1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	14.68	33.806	25.141	8.800	TIME 2253 PCT
5.0	12.79	33.816	25.538	6.590	WIND 30C/3
10.0	10.80	33.859	25.943	4.200	BARO 29.9C IN
20.0	9.41	33.895	26.208	3.230	TEMP 53 DE/51 WB
25.0	9.36	33.898	26.219	3.170	CLOUD ST 10/10 VIS .5 NM
30.0	9.29	33.915	26.243	2.980	SEA 30C/2 FT SWELL 30C/2 FT
40.0	9.18	33.967	26.302	2.300	
60.0	9.17	33.950	26.290	2.730	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NG VALUE

STATION

3 LATITUDE = 36 57.7N LONGITUDE = 122 24.0W DATE 11 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.26	33.757	25.358	7.970	TIME 0051 PDT
10.0	11.61	33.734	25.699	7.110	WIND 300/3
20.0	10.38	33.720	25.909	5.080	BARO 29.90 IN
30.0	9.72	33.822	26.100	4.040	TEMP 53 DE/51 WB
50.0	9.25	33.899	26.237	2.840	CLOUD ST 10/10 VIS .5 NM
75.0	8.98	33.965	26.332	2.600	SEA 300/1 FT SWELL 300/2 FT
100.0	8.85	33.986	26.369	2.750	
150.0	8.55	34.038	26.456	2.360	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

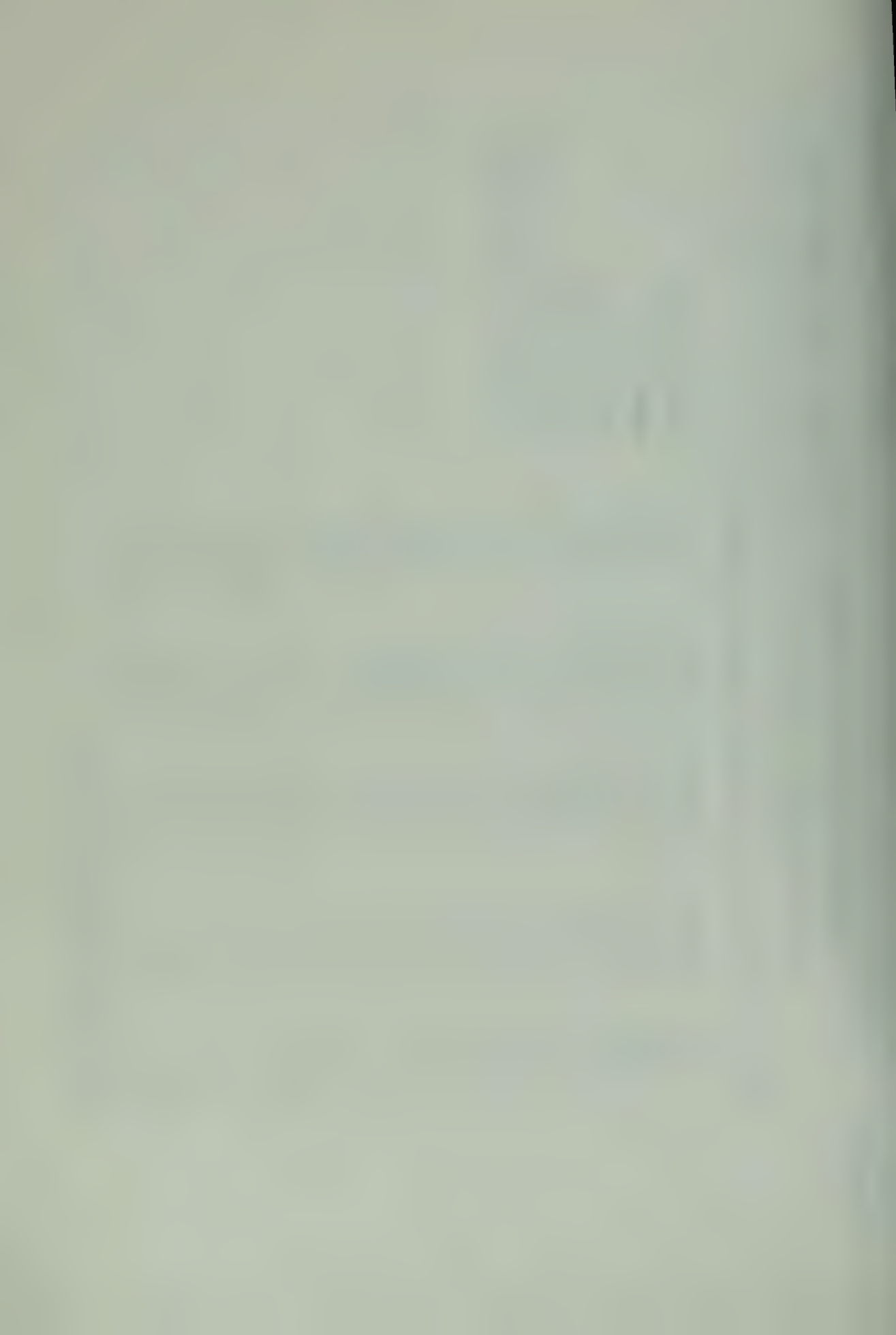
STATION

4 LATITUDE = 36 51.8N LONGITUDE = 122 35.6W DATE 11 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 05C4 PDT
0.0	14.06	33.674	25.171	6.090	WIND 300/5
10.0	13.24	33.638	25.311	4.550	BARO 29.90IN
20.0	11.23	33.615	25.677	5.920	TEM 52DB/45WB
30.0	10.34	33.541	25.776	3.420	CLOUD S7 10/10 VIS 0.25NM
50.0	9.95	33.675	25.947	2.760	SEA 300/2FT SWELL 300/2FT
75.0	9.34	33.936	26.251	2.270	
101.0	8.83	34.060	26.430	1.530	
152.0	8.63	34.149	26.531	1.410	
203.0	8.37	34.189	26.602	1.090	
304.0	7.42	34.242	26.784	1.000	
405.0	6.80	34.281	26.901	1.040	
470.0	6.26	34.300	26.988	1.180	
506.0	6.18	34.317	27.012	0.960	
564.0	5.40	34.339	27.126	0.580	
752.0	4.60	34.369	27.242	0.590	
940.0	3.90	34.439	27.372	0.450	
1128.0	3.46	34.507	27.470	0.740	
1410.0	2.84	34.554	27.566	0.740	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE



STATION

5 LATITUDE = 36 37.0N LONGITUDE = 123 7.5W DATE 11 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	14.30	33.485	24.975	6.610	TIME 1230 PDT
10.0	13.93	33.486	25.053	4.730	
20.0	13.15	33.500	25.222	3.950	WIND 32C/3
30.0	11.00	33.531	25.653	3.400	
50.0	10.19	33.646	25.884	3.170	BARO 29.54 IN
75.0	9.48	33.787	26.112	2.020	
100.0	9.11	33.876	26.242	1.970	TEM 54CE/50WB
150.0	8.79	34.089	26.459	1.340	
200.0	7.82	34.032	26.561	1.530	CLCUD ST 10/10 V15 5NM
300.0	6.53	34.096	26.792	0.850	
400.0	6.00	34.196	26.939	0.470	SEA 320/1FT SWELL 320/6FT
500.0	5.61	34.240	27.022	0.170	
600.0	5.13	34.281	27.112	0.440	
800.0	4.37	34.411	27.301	0.510	
1000.0	3.75	34.486	27.425	0.660	
1200.0	3.29	34.522	27.499	0.740	
1500.0	2.72	34.570	27.585	0.910	
2000.0	2.02	34.632	27.657	1.590	
2500.0	1.77	34.667	27.744	1.650	
3000.0	1.66	34.681	27.764	2.610	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

6 LATITUDE = 36 21.0N LONGITUDE = 123 42.0W DATE 11 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	16.12	32.786	24.041	5.910	TIME 2310 PCT
10.0	16.14	32.787	24.037	5.880	
20.0	16.06	32.787	24.055	5.840	WIND 28C/6
30.0	13.84	32.745	24.500	6.240	
50.0	12.06	32.939	25.000	6.530	BARO 29.92IN
75.0	11.47	32.952	25.119	6.150	
100.0	9.77	32.963	25.422	5.680	TEMP 57CB/56WB
150.0	9.25	33.657	26.048	4.830	
200.0	8.15	33.823	26.345	3.800	CLOUD ST 10/10 V15 8NM
300.0	7.33	33.994	26.602	2.950	
400.0	6.57	34.052	26.752	2.020	SEA 28C/1FT SWELL 270/5FT
500.0	5.76	34.103	26.856	1.780	
600.0	4.51	34.294	27.148	0.540	
800.0	4.36	34.354	27.288	0.920	
1000.0	3.78	34.467	27.407	1.180	
1200.0	3.75	34.475	27.416	1.050	
1500.0	3.30	34.495	27.476	1.120	
2000.0	2.75	34.557	27.576	1.510	
2500.0	2.14	34.604	27.665	1.850	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

7 LATITUDE = 36 44.0N LONGITUDE = 122 0.9W DATE 12AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.55	33.767	25.539	6.330	TIME 1148 PDT
10.0	11.38	33.851	25.833	5.510	WIND 340/3
20.0	10.76	33.885	25.971	4.940	BARO 25.95IN
30.0	10.18	33.909	26.090	4.300	TEMP 56CB 55WB
50.0	9.64	33.927	26.195	3.670	CLOUD 57/10/10 VIS 3NM
75.0	9.40	33.955	26.256	3.310	SEA 320/1FT SWELL 310/2FT
100.0	9.36	33.970	26.275	3.000	
150.0	9.07	34.020	26.361	2.680	
200.0	8.79	34.060	26.426	2.400	
300.0	7.91	34.142	26.635	1.970	
400.0	7.05	34.179	26.787	1.860	
500.0	6.19	34.225	26.938	1.500	
600.0	5.58	34.295	27.070	1.270	
800.0	4.62	34.402	27.266	1.200	
1000.0	3.52	34.463	27.389	1.400	

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NC VALUE

STATION

13 LATITUDE = 36 44.3N LONGITUDE = 121 52.9W DATE 13AUG1970

CBSERVEC VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.52	33.675	25.481	7.180	TIME 0315FDT
5.0	12.36	33.677	25.514	7.220	WIND 0
10.0	12.16	33.736	25.598	7.680	BARO 29.92IN
15.0	10.82	33.778	25.877	5.66C	TEMP 52CB/52WB
20.0	10.48	33.823	25.972	5.130	CLOUD 57/10/10 VIS 0.25NM
25.0	10.27	33.829	26.012	4.820	SEA 300/1FT SWELL 310/3FT
30.0	10.18	33.840	26.037	4.700	
35.0	10.09	33.874	26.078	4.480	
40.0	9.98	33.886	26.106	4.280	
50.0	9.88	33.905	26.138	4.240	
60.0	9.67	33.932	26.194	4.100	
70.0	9.44	33.957	26.252	3.620	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

15 LATITUDE = 36 47.9N LONGITUDE = 121 51.0W DATE 13AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 1933PDT
0.0	13.48	33.754	25.352	7.620	WIND 27C/6
5.0	13.37	33.752	25.372	7.870	BARO 29.86IN
10.0	13.21	33.779	25.425	8.350	TEMP 53CB 53WB
15.0	12.77	33.769	25.505	8.530	CLOUD ST/1/10 VIS 0.25NM
20.0	11.82	33.788	25.702	7.720	SEA 270/1FT SWELL 270/2FT
25.0	10.72	33.654	25.798	5.030	
30.0	10.06	33.840	26.057	4.020	
40.0	9.88	33.858	26.101	4.010	
50.0	9.77	33.881	26.138	3.370	
60.0	9.77	33.885	26.141	3.260	
75.0	9.67	33.892	26.163	3.060	
100.0	9.55	33.903	26.185	2.940	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

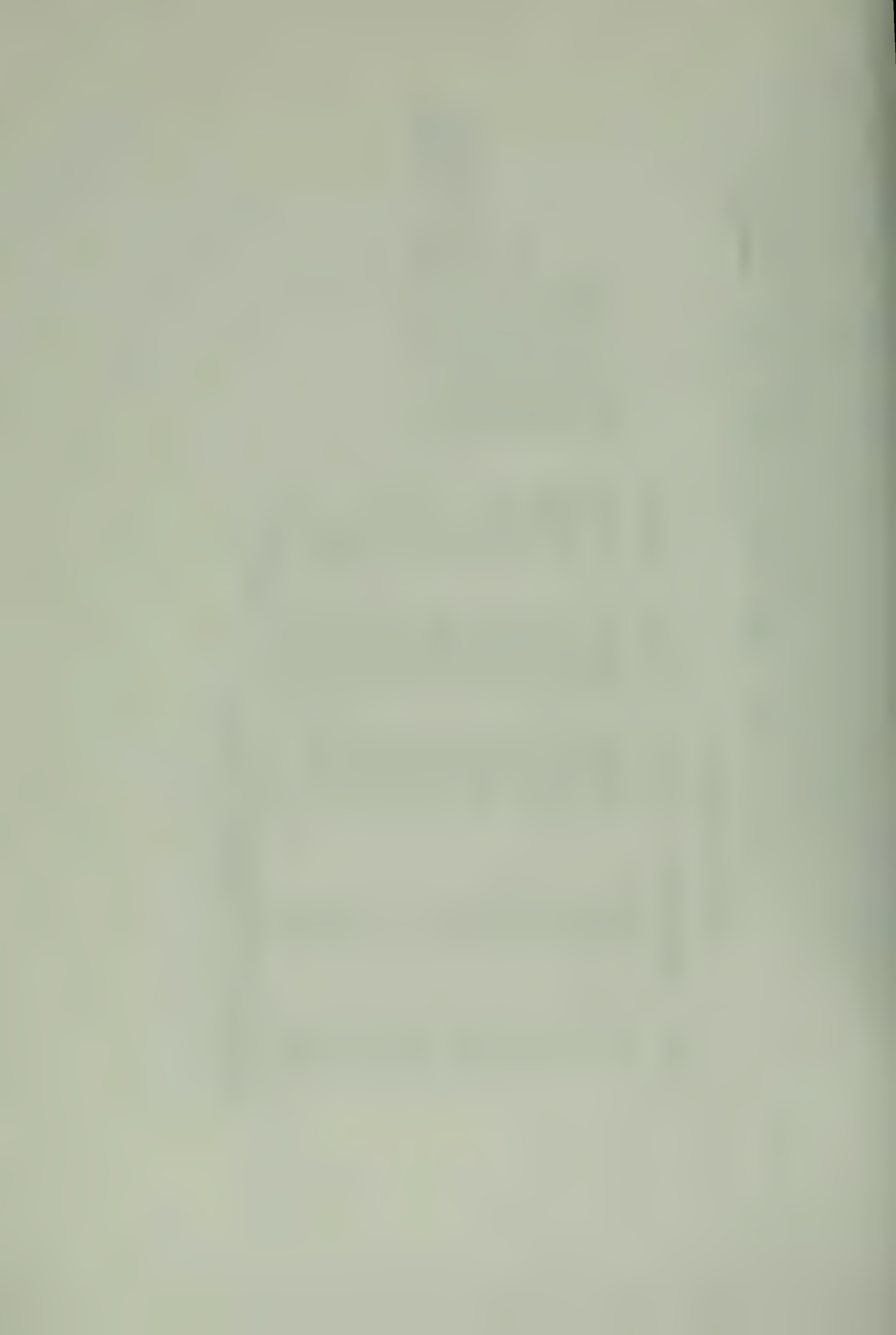
STATION

16 LATITUDE = 36 45.9N LONGITUDE = 121 56.2W DATE 13AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.51	33.662	25.473	6.520	TIME 2124PDT
5.0	12.49	33.662	25.477	6.500	WIND 27C/3
10.0	12.44	33.708	25.522	6.490	TEMP 52C/51WB
20.0	10.39	33.824	25.988	4.58C	BARO 29.86 IN
25.0	10.23	33.849	26.035	0.0	CLOUD ST 1/10 VIS 0.25NM
30.0	10.18	33.880	26.068	4.030	SEA 270/1FT SWELL 290/3FT
50.0	9.99	33.898	26.114	3.770	
75.0	9.85	33.897	26.137	3.680	
100.0	9.6C	33.927	26.202	0.0	
150.0	9.45	33.949	26.244	2.950	
200.0	8.36	34.079	26.518	2.120	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE



STATION

17. LATITUDE = 36 43.8N LONGITUDE = 122 0.8W DATE 14AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.28	33.724	25.565	6.490	TIME 0015PDT
10.0	11.45	33.763	25.751	5.890	WIND 33C/10
20.0	11.67	33.825	25.759	0.0	BARO 29.86 IN
30.0	10.22	33.863	26.030	4.150	TEMP 52CB/53WB
50.0	10.10	33.864	26.069	3.870	CLOUD ST 1/10 VIS 2NM
75.0	9.73	33.902	26.161	3.420	SEA 290/1FT SWELL 300/3FT
100.0	9.40	33.928	26.235	3.110	
150.0	9.13	34.002	26.337	2.340	
200.0	8.60	34.048	26.456	1.810	
300.0	8.00	34.110	26.596	2.160	
400.0	7.18	34.159	26.753	1.600	
500.0	6.40	34.202	26.852	1.920	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

18 LATITUDE = 36 42.1N LONGITUDE = 122 8.2W DATE 14AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0244FDT
0.0	11.88	33.734	25.649	5.67C	WIND 31C/8
10.0	11.26	33.686	25.708	5.790	BARO 29.85 IN
20.0	10.91	33.803	25.880	5.240	TEMP 52CB/52WB
30.0	10.19	33.831	26.028	4.330	CLOUD NCNE VIS 8NM
50.0	9.21	33.893	26.239	3.350	SEA 310/1FT SWELL 3C0/4FT
75.0	9.09	33.945	26.299	2.940	
100.0	9.07	33.994	26.340	2.590	
148.0	8.96	34.028	26.384	2.540	
199.0	8.25	34.044	26.507	2.650	
296.0	7.73	34.116	26.641	1.870	
354.0	6.73	34.141	26.800	1.470	
453.0	6.13	34.204	26.929	1.140	
497.0	6.10	34.203	26.932	0.800	
556.0	5.49	34.258	27.051	0.650	
655.0	5.12	34.324	27.147	0.530	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

19 LATITUDE = 36 40.8N LONGITUDE = 122 13.1W DATE 14AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0730 PDT
0.0	11.95	33.720	25.625	5.080	WIND 32C/15
9.0	11.94	33.720	25.627	4.240	BARO 29.88IN
19.0	11.60	33.710	25.683	4.100	TEMP 56DB/54WB
28.0	10.24	33.780	25.980	3.850	CLOUD ST 6/10 VIS 8NM
47.0	9.61	33.860	26.148	3.660	SEA 320/1FT SWELL 320/6FT
71.0	9.28	33.970	26.288	2.040	
95.0	9.08	34.000	26.343	2.370	
143.0	8.72	34.070	26.455	2.240	
150.0	8.50	34.120	26.528	2.230	
285.0	8.19	34.140	26.591	1.780	
380.0	6.88	34.110	26.756	1.700	
475.0	6.19	34.190	26.910	1.280	
492.0	6.13	34.190	26.918	1.070	
591.0	5.45	34.240	27.042	0.0	
650.0	5.10	34.320	27.147	0.620	
789.0	4.63	34.380	27.248	0.670	
888.0	4.27	34.410	27.311	0.630	
986.0	3.85	34.450	27.386	0.720	

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NO VALUE

STATION

20 LATITUDE = 36 38.6N LONGITUDE = 122 18.6W DATE 14AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.88	33.730	25.646	6.370	TIME 1000 PDT
10.0	11.86	33.736	25.654	6.260	WIND 315/11
20.0	11.79	33.746	25.675	6.100	BARO 29.90IN
29.0	10.28	33.825	26.008	4.400	TEMP 57CB/55WB
49.0	9.74	33.835	26.107	3.190	CLOUD ST 1/10 VIS 4NM
74.0	9.31	33.937	26.257	2.720	SEA 315/3FT SWELL 315/6FT
98.0	9.10	33.985	26.328	2.220	
147.0	8.74	34.062	26.446	1.970	
196.0	8.51	34.104	26.514	1.700	
296.0	8.20	34.136	26.586	1.590	
395.0	7.63	34.173	26.700	1.240	
478.0	6.27	34.147	26.866	1.180	
495.0	6.14	34.148	26.884	0.920	
574.0	5.64	34.228	27.009	0.870	
772.0	4.57	34.341	27.223	0.360	
970.0	3.98	34.445	27.369	0.610	
1170.0	3.41	34.598	27.548	1.550	

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NC VALUE

STATION

21 LATITUDE = 36 35.7N LONGITUDE = 122 23.2W DATE 14AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	11.32	33.347	25.452	5.850	TIME 1400 PDT
9.0	11.28	33.350	25.462	5.760	WIND 315/10
18.0	11.17	33.669	25.729	5.430	BARO 29.89IN
26.0	11.02	33.756	25.824	5.240	TEMP 59CB/57DB
44.0	10.45	33.800	25.959	4.350	CLOUD ST 1/10 VIS 4NM
66.0	9.43	33.832	26.156	3.560	SEA 315/2FT SWELL 315/7FT
90.0	8.81	33.911	26.317	3.200	
136.0	8.56	34.049	26.463	2.490	
180.0	8.43	34.114	26.534	2.090	
266.0	8.13	34.177	26.629	1.500	
362.0	6.94	34.175	26.759	1.420	
445.0	6.36	34.180	26.880	0.940	
460.0	6.24	34.218	26.926	1.100	
535.0	5.85	34.242	26.954	0.800	
726.0	4.67	34.350	27.197	0.650	
922.0	4.24	34.468	27.360	1.360	
1120.0	3.55	34.481	27.441	0.830	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

23 LATITUDE = 36 21.8N LONGITUDE = 122 51.0W DATE 14AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 2030 PDT
0.0	13.41	33.599	25.246	6.540	WIND 320/25
10.0	11.99	33.719	25.617	6.570	BARO29.88
20.0	9.81	33.643	25.946	4.530	TEMP 55CB/54WB
29.0	10.00	33.825	26.055	3.780	CLOUD ST 10/10 VIS 6 NM
49.0	9.71	33.873	26.141	3.670	SEA 320/5 FT SWELL 320/12 FT
73.0	9.42	33.928	26.232	3.140	
98.0	8.98	33.962	26.330	2.840	
147.0	8.38	34.065	26.504	2.320	
197.0	7.61	34.075	26.626	2.060	
295.0	6.57	34.129	26.812	1.350	
394.0	5.88	34.172	26.935	0.890	
493.0	5.70	34.266	27.032	0.550	
500.0	5.62	34.256	27.034	1.480	
600.0	5.05	34.327	27.158	1.630	
800.0	4.34	34.419	27.310	0.690	
1000.0	3.82	34.472	27.407	1.280	
1200.0	3.23	34.517	27.500	1.450	
1500.0	2.74	34.567	27.585	1.190	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

25 LATITUDE = 36 5.8N LONGITUDE = 123 29.2W DATE 15AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0215 PDT
0.0	14.91	33.252	24.665	5.900	WIND 33C/20
10.0	14.90	33.250	24.666	5.950	BARO 29.87 IN
20.0	14.82	33.251	24.684	5.930	TEMP 56DB/52WB
30.0	12.50	32.815	24.820	6.450	CLOUD ST 10/10 VIS 6 NM
50.0	11.25	32.956	25.162	6.020	SEA 330/4FT SWELL 320/10 FT
75.0	10.10	33.090	25.466	4.430	
100.0	9.41	33.113	25.558	4.720	
150.0	8.21	33.849	26.360	3.650	
195.0	7.84	33.992	26.527	2.820	
258.0	6.80	34.067	26.733	1.980	
398.0	5.78	34.054	26.886	1.440	
497.0	5.38	34.184	27.006	0.830	
499.0	5.33	34.195	27.021	0.850	
798.0	4.35	34.331	27.239	1.350	
958.0	3.76	34.454	27.358	0.750	
1497.0	2.71	34.555	27.578	1.310	
1596.0	2.03	34.611	27.679	1.830	
2494.0	1.76	34.647	27.729	2.620	
2993.0	1.67	34.666	27.751	2.890	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

26 LATITUDE = 36 42.3N LONGITUDE = 121 57.1W DATE 15AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 1554 PDT
0.0	12.42	33.746	25.556	6.270	WIND CALM
5.0	11.73	33.769	25.704	6.070	BARO 29.95 IN
10.0	11.10	33.786	25.833	5.230	TEMP 58.08/53WB
15.0	10.82	33.830	25.917	4.850	CLOUD ST 10/10 VIS 6 NM
20.0	10.71	33.834	25.940	4.780	SEA SWELL 315/4 FT
25.0	10.67	33.843	25.954	4.620	
30.0	10.57	33.846	25.974	4.740	
40.0	10.43	33.859	26.008	4.430	
50.0	10.31	33.862	26.031	4.260	
60.0	10.18	33.863	26.054	4.250	
75.0	10.09	33.878	26.081	4.100	
85.0	9.81	33.892	26.140	3.840	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

27 LATITUDE = 36 46.5N LONGITUDE = 121 58.7W DATE 15AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 1826 PDT
0.0	12.51	33.715	25.514	6.620	WIND NONE
10.0	12.24	33.734	25.581	6.700	BARO 29.92 IN
20.0	10.75	33.806	25.913	4.980	TEMP 57CB/56WB
30.0	10.26	33.824	26.010	4.380	CLOUD ST 10/10 VIS 8 NM
50.0	9.73	33.865	26.132	3.400	SEA 270/1FT SWELL 280/4FT
75.0	9.47	33.929	26.225	2.950	
100.0	9.33	33.957	26.269	2.530	
150.0	9.03	33.994	26.347	2.170	
200.0	8.42	34.058	26.492	1.750	
300.0	8.03	34.110	26.592	1.590	
400.0	7.10	34.159	26.764	1.220	
500.0	6.56	34.168	26.750	0.0	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

28 LATITUDE = 36 51.4N LONGITUDE = 121 59.4W DATE 15AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 2109 PDT
0.0	13.13	33.780	25.442	7.140	WIND
5.0	13.15	33.780	25.438	7.430	BARO 29.93 IN
10.0	12.63	33.780	25.541	7.350	TEMP 53DB/52WB
20.0	10.56	33.750	25.901	4.780	CLOUD ST 10/10 VIS 10NM
30.0	10.01	33.750	25.955	4.010	SEA
40.0	9.80	33.780	26.054	3.760	SWELL
50.0	9.55	33.860	26.158	3.320	
60.0	9.45	33.910	26.213	2.570	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

29 LATITUDE = 36 54.9N LONGITUDE = 122 1.8W DATE 15AUG197C

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		TIME 2232 PDT
0.0	14.05	33.790	25.262	7.650		
5.0	12.65	33.750	25.537	7.710		WIND CALM
10.0	10.20	33.832	26.027	3.640		BARO 29.53 IN
15.0	10.03	33.842	26.064	3.110		TEMP 53CBC52WB
20.0	10.02	33.841	26.064	3.240		CLOUD ST 10/10 VIS 10 NM
25.0	10.02	33.850	26.072	3.130		SEA----- SWELL -----

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

30 LATITUDE = 36 53.7N LONGITUDE = 121 55.6W DATE 15AUG197C

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		TIME 2348 PDT
0.0	13.29	33.780	25.410	7.830		
5.0	12.08	33.770	25.639	7.280		WIND CALM EARC 29.94 IN
10.0	10.74	33.750	25.869	5.040		TEMP 52CE/51WB SEA --SWELL --
15.0	10.57	33.770	25.915	4.680		CLOUD ST 10/10 VIS 10NM

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

31 LATITUDE = 36 44.0N LONGITUDE = 121 54.2W DATE 16AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0205 PDT
0.0	12.13	33.3290	2.132	5.980	WIND -----
5.0	11.21	33.797	25.803	4.910	BARO 29.92 IN
10.0	10.51	33.830	25.972	4.350	TEMP 52 DE/48 WB
15.0	10.37	33.845	26.008	4.220	CLOUD ST 10/10 VIS 6 NM
20.0	10.22	33.848	26.036	4.020	SEA-- SKELL---
30.0	10.19	33.853	26.045	3.880	
50.0	10.16	33.860	26.055	3.850	
75.0	9.55	33.878	26.058	3.670	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

33 LATITUDE = 36 18.2N LONGITUDE = 121 57.8W DATE 16AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 2031 PDT
0.0	13.14	33.797	25.453	5.680	WIND 24C/3
5.0	11.96	33.790	25.677	5.620	BARO 25.51 IN
10.0	11.44	33.804	25.785	5.200	TEMP 56 DE/52 WB
15.0	11.21	33.799	25.805	5.200	CLOUD SC 8/10 VIS 8 NM
20.0	11.22	33.795	25.818	5.140	SEA 24C/C.5 FT SWELL 300/3 FT
25.0	0.0	33.806	27.164	5.030	
30.0	10.82	33.809	25.901	4.680	
35.0	10.70	33.809	25.922	4.410	
40.0	10.54	33.818	25.957	4.120	
45.0	10.45	33.818	25.973	4.010	
50.0	10.27	33.828	26.012	3.760	
60.0	10.00	33.849	26.074	3.400	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

34 LATITUDE = 36 11.0N LONGITUDE = 121 44.0W DATE 17AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.04	33.753	25.634	5.760	TIME 0047 PDT
5.0	12.05	33.756	25.634	5.740	WIND 240/3
10.0	11.35	33.770	25.775	5.100	BARO 29.94 IN
15.0	11.00	33.789	25.853	4.700	TEMP 53 DE/49 WB
20.0	10.74	33.806	25.913	4.380	CLOUD CF C/10 VIS 10 NM
30.0	10.46	33.834	25.984	4.060	SEA 240/0.5 FT SWELL 300/2 FT
50.0	10.03	33.848	26.068	3.350	
75.0	9.85	33.870	26.109	3.260	
100.0	9.66	33.895	26.167	3.110	
150.0	8.94	34.014	26.377	2.460	
200.0	8.70	34.068	26.457	2.140	
250.0	8.48	34.096	26.513	2.040	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

35 LATITUDE = 36 9.2N LONGITUDE = 121 49.4W DATE 17AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0320 PCT
0.0	13.52	33.680	25.286	6.410	WIND 240/3
10.0	13.45	33.681	25.301	6.430	BARO 29.55 IN
20.0	12.32	33.689	25.531	5.430	TEMP 53 DE/50 WB
30.0	11.79	33.742	25.672	5.680	CLOUD ST 10/10 VIS 5 NM
50.0	10.47	33.812	25.965	3.800	SEA CALM SWELL 300/3 FT
75.0	9.92	33.841	26.081	3.420	
100.0	9.45	33.904	26.202	2.920	
150.0	9.10	33.999	26.339	2.700	
200.0	8.61	34.067	26.470	0.0	
300.0	8.02	34.155	26.660	3.530	
400.0	7.05	34.207	26.809	0.0	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

36 LATITUDE = 36 4.0N LONGITUDE = 122 0.3W DATE 17 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0657 PDT
0.0	13.61	33.675	25.264	6.270	WIND 240/3
10.0	13.22	33.674	25.342	6.510	BARO 29.94 IN
20.0	13.00	33.678	25.389	6.160	TEMP 54 DE/51 WB
30.0	12.78	33.682	25.436	6.020	CLOUD ST 10/10 VIS 4 NM
50.0	11.57	33.765	25.731	5.470	SEA CALM SWELL 300/4 FT
75.0	10.25	33.760	25.962	3.830	
100.0	9.50	33.866	26.171	2.660	
149.0	8.87	34.002	26.378	5.250	
199.0	8.34	34.074	26.517	2.160	
248.0	7.86	34.154	26.651	1.710	
298.0	7.41	34.185	26.744	1.410	
298.0	6.69	34.206	26.857	1.550	
496.0	5.84	34.208	26.969	0.670	
596.0	5.11	34.238	27.081	1.090	
696.0	4.87	34.301	27.158	0.280	
795.0	4.59	34.364	27.239	0.340	
995.0	3.95	34.448	27.374	0.500	
1195.0	3.53	34.494	27.453	0.640	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

37 LATITUDE = 35 55.0N LONGITUDE = 122 18.0W DATE 17AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 1252 PDT
0.0	15.13	33.496	24.805	6.290	WIND 34C/3
10.0	14.16	33.485	25.004	6.400	BARO 29.58 IN
20.0	13.39	33.669	25.304	5.930	TEMP 68CB/60WB
30.0	12.84	33.671	25.416	5.570	CLOUD ST 10/10 VIS 7NM
49.0	12.34	33.708	25.542	5.240	SEA RIPPLE SWELL 300/4FT
74.0	11.39	33.736	25.742	4.360	
98.0	9.79	33.833	26.097	3.230	
148.0	9.43	33.904	26.212	2.830	
197.0	8.92	34.039	26.399	2.260	
246.0	8.27	34.055	26.512	2.240	
295.0	7.53	34.176	26.717	1.200	
384.0	6.89	34.208	26.831	0.850	
481.0	6.06	34.208	26.941	0.590	
578.0	5.57	34.278	27.057	1.670	
675.0	5.09	34.324	27.151	0.200	
772.0	4.81	34.361	27.212	0.280	
967.0	4.06	34.425	27.345	0.500	
1162.0	3.58	34.474	27.432	0.660	
1467.0	2.84	34.525	27.542	0.890	
1948.0	2.08	34.595	27.663	0.310	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

38 LATITUDE = 35 42.5N LONGITUDE = 122 43.0W DATE 17 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	14.55	33.539	24.963	6.330	TIME 2158 PCT
10.0	14.22	33.530	25.026	6.390	WIND 280/5
20.0	14.03	33.550	25.081	6.320	BARO 25.54 IN
30.0	11.52	33.251	25.342	6.040	TEMP 57 DE/53 MB
49.0	10.53	33.411	25.642	5.360	CLOUD ST 10/10 VIS 8 NM
74.0	9.91	33.719	25.588	3.720	SEA SLIGHT SWELL 300/5 FT
99.0	9.17	33.836	26.201	3.180	
145.0	8.43	33.963	26.416	2.930	
199.0	7.88	34.068	26.581	2.050	
249.0	7.28	34.085	26.681	1.830	
298.0	6.87	34.114	26.760	1.460	
382.0	6.25	34.145	26.870	1.140	
397.0	6.22	34.221	26.518	0.660	
479.0	6.21	34.289	26.986	0.430	
576.0	5.40	34.313	27.106	0.430	
673.0	4.53	34.341	27.183	0.290	
770.0	4.72	34.400	27.253	0.320	
967.0	4.03	34.455	27.375	0.460	
1164.0	3.45	34.505	27.473	0.820	

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NC VALUE

STATION

39 LATITUDE = 35 30.0N LONGITUDE = 123 10.0W DATE 18 AUG 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	CXYGEN	
0.0	14.60	33.477	24.905	6.080	TIME 0403 PDT
10.0	14.59	33.576	24.983	6.440	WIND 34C/6
20.0	14.33	33.599	25.056	6.070	BARO 29.95 IN
30.0	13.86	33.581	25.140	6.060	TEMP 55 DE/51 WB
49.0	11.51	33.689	25.683	4.630	CLOUD ST 10/10 VIS 8 NM
74.0	9.94	33.780	26.031	3.290	SEA SLIGHT SWELL 300/4 FT
98.0	9.14	33.922	26.273	2.640	
147.0	8.22	34.019	26.475	2.470	
196.0	7.80	34.048	26.577	2.040	
256.0	6.84	34.121	26.770	1.250	
395.0	6.23	34.216	26.926	0.610	
495.0	5.59	34.258	27.039	0.330	
496.0	5.48	34.264	27.057	0.290	
595.0	4.97	34.297	27.143	0.380	
793.0	4.37	34.413	27.302	0.340	
991.0	3.76	34.468	27.410	0.530	
1190.0	3.34	34.504	27.479	0.600	
1487.0	2.72	34.543	27.567	0.950	
1983.0	2.14	34.600	27.662	1.660	
2481.0	1.78	34.632	27.716	2.250	
2979.0	1.70	34.647	27.734	2.580	

STATION

40 LATITUDE = 36 43.8N LONGITUDE = 122 0.8W DATE 18 AGU 1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.61	33.759	25.529	6.800	TIME 1658 PDT
10.0	12.01	33.757	25.642	6.630	WIND 28C/12
20.0	11.00	33.758	25.860	4.970	BARO 30.00IN
30.0	10.52	33.801	25.947	4.050	TEMP 54CE/5CWB
49.0	10.16	33.826	26.029	3.620	CLOUD ST 10/10 VIS 5NM
74.0	9.56	33.845	26.078	2.910	SEA 280/1FT SWELL 280/2FT
99.0	9.74	33.892	26.151	3.270	
148.0	9.36	33.928	26.242	2.650	
192.0	9.04	33.989	26.341	2.080	
198.0	8.94	33.992	26.359	1.760	
292.0	7.69	34.115	26.646	1.460	
290.0	7.23	34.154	26.742	1.250	
489.0	6.39	34.177	26.874	0.890	
588.0	5.80	34.225	26.987	0.610	
687.0	5.18	34.306	27.126	0.470	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

41 LATITUDE = 36 42.4N LONGITUDE = 121 58.2W DATE 15AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 0209 PDT
0.0	12.83	33.759	25.486	6.330	WIND 280/7
10.0	12.75	33.763	25.497	5.850	BARO 25.54 IN
20.0	11.43	33.766	25.757	5.310	TEMP 50CE/48WB
30.0	10.86	33.818	25.501	4.450	CLOUD ST 10/10 VIS 5NM
50.0	10.62	33.830	25.952	4.140	SEA 28C/1FT SWELL 280/2FT
75.0	10.03	33.873	26.088	3.790	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION 42 LATITUDE = 36 46.7N LONGITUDE = 121 58.4W DATE 19 AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	12.85	33.744	25.470	6.760	TIME 0411PDT
10.0	12.22	33.749	25.577	7.070	WIND CALM
20.0	11.40	33.765	25.762	5.450	BARO 29.54IN
30.0	10.60	33.781	25.918	4.640	TEMP 52CB/5CWB
50.0	10.16	33.830	26.032	3.760	CLCUD ST 10/10 VIS 4NM
75.0	9.88	33.864	26.106	3.670	SEA RIPPLE SWELL 280/2FT
100.0	9.59	33.914	26.193	3.250	
150.0	9.28	33.967	26.285	2.560	
200.0	8.53	34.055	26.473	1.960	
300.0	7.42	34.155	26.716	1.360	
400.0	6.97	34.178	26.797	1.180	
500.0	6.12	34.236	26.955	0.740	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

43 LATITUDE = 36 51.6N LONGITUDE = 121 55.6W DATE 19AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
-------	-------------	----------	---------	--------

0.0	13.50	33.773	25.362	7.240
-----	-------	--------	--------	-------

10.0	12.72	33.764	25.511	7.350
------	-------	--------	--------	-------

20.0	10.93	33.745	25.832	5.040
------	-------	--------	--------	-------

30.0	10.21	33.770	25.977	4.000
------	-------	--------	--------	-------

50.0	10.01	33.859	26.080	3.850
------	-------	--------	--------	-------

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NO VALUE

TIME 0621 PDT

WIND CALM

BARO 29.96 SEA CALM

TEMP 52CB/49WB SWELL 270/2FT

CLCUDS ST 10/10 VIS INM

STATION

44 LATITUDE = 36 54.9N LONGITUDE = 122 0.8W DATE 19AUG1970

CBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN
-------	-------------	----------	---------	--------

0.0	14.08	33.784	25.251	7.500
-----	-------	--------	--------	-------

5.0	11.65	33.735	25.693	5.980
-----	-------	--------	--------	-------

10.0	10.48	33.768	25.929	4.430
------	-------	--------	--------	-------

* INDICATES ADJUSTED VALUE

? INDICATES QUESTIONABLE VALUE

X INDICATES NO VALUE

TIME 0758FDT WIND CALM/BARC

29.97IN/TEMP 53CB/50WB CLOUD ST

10/10 SEA CALM SWELL270/2FT VIS2

STATION

46 LATITUDE = 36 44.2N LONGITUDE = 121 53.3W DATE 19AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		TIME 1122 PDT
0.0	12.88	33.754	25.472	6.550		
10.0	12.71	33.765	25.514	6.740		WIND 27C/8
20.0	11.46	33.802	25.78C	5.65C		BARO 25.98IN
30.0	10.61	33.838	25.960	4.38C		TEMP 53CB/48WB
40.0	10.38	33.853	26.012	4.100		CLOUD ST 10/10 VIS 1NM
50.0	10.23	33.852	26.037	3.760		SEA CALM SWELL 270/2 FT

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

45 LATITUDE = 36 53.8N LONGITUDE = 121 55.2W DATE 19AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN		TIME 0814 PDT
0.0	13.60	33.763	25.334	7.040		
5.0	12.86	33.765	25.484	6.650		WIND 27C/8 BARC 29.98IN
10.0	11.88	33.753	25.664	6.070		TEMP 53CB/48WB
15.0	11.13	33.807	25.844	5.010		CLOUD ST 1C/10 VIS 1 NM
20.0	10.91	33.823	25.896	4.660		SEA CALM SWELL 270/2FT

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

47-A LATITUDE = 36 42.3N LONGITUDE = 121 58.2W DATE 09AUG197C

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 2007
0.0	12.02	33.751	25.636	5.650	
10.0	11.27	33.761	25.783	5.030	WIND 320/12
20.0	10.96	33.788	25.860	4.410	BARO 29.97IN
30.0	10.68	33.807	25.924	3.870	TEMP 53CB/4SWB
50.0	10.50	33.826	25.970	3.740	CLOUD ST 10/10 VIS 6NM
74.0	10.08	33.852	26.063	3.460	SEA 320/2FT SWELL 320/4FT
99.0	10.00	33.729	25.981	3.390	
148.0	9.22	33.547	26.279	2.600	
198.0	8.83	34.015	26.395	2.190	
248.0	7.67	34.131	26.661	1.410	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

STATION

48 LATITUDE = 36 25.8N LONGITUDE = 122 5.4W DATE 19AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	TIME 2333 PCT
0.0	12.56	33.725	25.512	6.060	WIND 350/20
10.0	12.50	33.721	25.521	6.130	BARO 29.98 IN
19.0	12.34	33.732	25.560	5.950	TEMP 52 DE/48 WB
29.0	12.22	33.737	25.587	5.770	CLOUD ST 10/10 VIS 6 NM
49.0	10.45	33.817	25.972	4.060	SEA 320/3 FT SWELL 320/5 FT
73.0	9.84	33.891	26.134	3.140	
98.0	9.71	33.913	26.173	2.990	
147.0	9.23	33.988	26.310	2.870	
195.0	8.73	34.096	26.474	2.100	
244.0	8.25	34.121	26.567	2.060	
296.0	7.73	34.191	26.699	1.580	
348.0	7.47	34.174	26.724	1.500	
395.0	6.78	34.182	26.826	1.360	
430.0	6.37	34.143	26.850	1.250	
511.0	6.14	34.235	26.952	0.680	
593.0	5.38	34.295	27.097	0.500	
675.0	4.81	34.375	27.227	0.540	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NO VALUE

STATION

49 LATITUDE = 36 22.0N LONGITUDE = 122 14.3W DATE 20AUG1970

OBSERVED VALUES

DEPTH	TEMPERATURE	SALINITY	SIGMA-T	OXYGEN	
0.0	13.12	33.700	25.383	6.540	TIME 0320PDT
9.0	13.12	33.697	25.380	6.650	WIND 34C/18
17.0	13.10	33.699	25.386	6.650	BARO 29.95IN
26.0	13.02	33.818	25.494	6.610	TEMP 51CB 48WB
43.0	12.07	33.812	25.674	5.840	CLOUD ST 10/10 VIS 6 NM
65.0	10.58	33.755	25.901	4.560	SEA 340/3FT SWELL 320/5FT
87.0	9.83	33.815	26.076	3.570	
117.0	9.10	33.909	26.269	2.830	
148.0	8.47	34.003	26.441	2.780	
178.0	8.20	34.060	26.527	2.280	
210.0	7.90	34.061	26.572	2.250	
270.0	7.29	34.166	26.743	1.310	
379.0	7.07	34.217	26.814	1.030	
476.0	6.06	34.205	26.939	1.100	
574.0	5.52	34.236	27.030	0.590	
769.0	4.75	34.368	27.225	0.530	
965.0	3.98	34.459	27.380	0.840	

* INDICATES ADJUSTED VALUE
 ? INDICATES QUESTIONABLE VALUE
 X INDICATES NC VALUE

BIBLIOGRAPHY

- ✓ 1. Defant, A., 1961. Physical Oceanography. Pergamon, Oxford. vol. 1. 745 p.
2. Fomin, L.M. 1964. The Dynamic Method in Oceanography. Elsevier, New York. 212 p.
- 3. Kin'dyushev, V.I. 1970. Seasonal Variations of Water Masses in the California Region of the Pacific Ocean. Oceanology 10(4): 456-464.
4. Namias, J. 1970. Macroscale Variations in Sea-surface Temperatures in the North Pacific. J. Geophys. Res. 75(3): 565-582.
5. Neumann, G. and W.J. Pierson, Jr. 1966. Principles of Physical Oceanography. Prentice-Hall. Englewood Cliffs, New Jersey. 545 p.
6. Pavlova, Yu. V. 1966. Seasonal Variations of the California Current. Oceanology 6(6): 806-814.
7. Reid, J.L., Jr. 1960. Oceanography of the North Pacific Ocean During the Last Ten Years. Rancho Santa Fe Symposium on 1957-1958, Years of Change. CALCOFI Reports: Vol 7: 77-90.
8. Reid, J.L., G.I. Roden, and J.G. Wyllie. 1958. Studies of the California Current System. CALCOFI Prog. Rept., 1 July 1956 - 1 January 1958: 27-56.
9. Reid, J.L. and R.A. Swartzlose. 1963. Direct Measurements of the Davidson Current off Central California. J. Geophys. Res. 67(6): 2491-2497.
- ✓ 10. Reid, J.L., R.A. Swartzlose, and D.M. Brown. 1963. Direct Measurements of a Small Surface Eddy off Northern Baja California. J. Marine Res. 21(3): 205-218.
11. Roden, G.I. 1971. Aspects of the Transition Zone in the Northeastern Pacific. J. Geophys. Res. 76(15): 3462-3475.
12. Sandstrom, J.W. and B. Helland-Hansen. 1903. Uber die Berechnung von Meerestromungen. Bergen, Norway. 43 p. (Report on Norwegian Fisheries and Marine Investigation, 2(4)).

13. Skogsberg, Tage. 1936. Hydrography of Monterey Bay, California. Thermal Conditions, 1929-1933. Amer. Phil. Soc. Trans., Vol. 29. 152 p.
- ✓14. Stommel, H. 1965. The Gulf Stream, a Physical and Dynamical Description. U. of California, Berkely. 248 p.
15. Sverdrup, H.U. and R.H. Fleming. 1941. The Waters Off the Coast of Southern California, March to July, 1937. Bull. Scripps Inst. Oceanogr. Univ. Calif., Vol. 4: 261-378.
16. Sverdrup, H.U., M.W. Johnson and R.H. Fleming. 1942. The Oceans, Their Physics, Chemistry, and General Biology. Prentice-Hall, Inc., New York. 1087 p.
17. Tibby, R.B. 1941. The Water Masses of the West Coast of North America. J. Marine Res., 4(2): 112-121.

INITIAL DISTRIBUTION LIST

	No. Copies
1. Defense Documentation Center Cameron Station Alexandria, Virginia 22314	2
2. Library (Code 0212) Naval Postgraduate School Monterey, California 93940	2
3. Oceanographer of the Navy Hoffman II 200 Stovall Street Alexandria, Virginia 22332	1
4. Naval Oceanographic Office Library (Code 3330) Washington, D.C. 20373	1
5. Dr. Ned A. Ostenso (Code 480D) Office of Naval Research Arlington, Virginia 22217	1
6. Department of Oceanography, Code 58 Naval Postgraduate School Monterey, CA 93940	3
7. Dr. Robert E. Stevenson Scientific Liaison Office Scripps Institution of Oceanography La Jolla, CA 92037	1
8. National Marine Fisheries Fleet Numerical Weather Central Naval Postgraduate School Monterey, CA 93940	1
9. Director Hopkins Marine Station Pacific Grove, CA 93950	1
10. Director Moss Landing Marine Laboratory Moss Landing, CA 95039	1

- | | | |
|-----|---|---|
| 11. | Dr. Stevens P. Tucker
Code 58Tx
Naval Postgraduate School
Monterey, CA 93940 | 1 |
| 12. | Mr. Jerrold G. Norton
Code 58
Naval Postgraduate School
Monterey, CA 93940 | 1 |
| 13. | Dr. Robert H. Bourke
Code 58Bf
Naval Postgraduate School
Monterey, CA 93940 | 5 |
| 14. | Assoc. Prof. J.B. Wickham
Code 58Wk
Naval Postgraduate School
Monterey, CA 93940 | 1 |
| 15. | LCDR Calvin R. Dunlap
Code 58Du
Naval Postgraduate School
Monterey, CA 93940 | 1 |
| 16. | LCDR Robert L. Brown
COMCARGRU ONE Staff
c/o FPO
San Francisco, CA 96601 | 4 |
| 17. | Mr. Joe Reid
Scripps Institute of Oceanography
La Jolla, CA 92037 | 1 |
| 18. | Dr. Michael Laurs
National Marine Fisheries
La Jolla, CA 92037 | 1 |

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Geostrophic Circulation off the Coast of Central California		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; March 1974
7. AUTHOR(s) Robert Lee Brown		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Naval Postgraduate School Monterey, California 93940		12. REPORT DATE March 1974
		13. NUMBER OF PAGES 265
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) California Current Davidson Current Geostrophic Circulation Water Masses		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The seasonal variations in temperature, salinity, water masses and geostrophic currents at the surface and 200 m are discussed for the region off the Central California coast near Monterey. The results were obtained from data collected on six cruises covering a span of two years from 1970 to 1972. It is shown that the surface currents are subject to marked seasonal variability with the mean flow characterized by eddies		

(20. ABSTRACT continued)

and filaments. The currents at 200 m are similar to those found at the surface. The bottom topography influences the direction of flow inside the 1000 fathom curve.

Seasonal variations in temperature and salinity generally conformed to Skogsberg's (1936) annual cycle composed of three distinct hydrographic seasons.

Only subtle changes in water masses from season to season were noted. Greater than 60 per cent Equatorial Pacific water is found throughout the year below 800 m. The proportion of Equatorial Pacific water increases with depth and towards shore.

Thesis

B82243

Brown

c.1

Geostrophic circulation off the coast of Central California.

149298

13 JUN 75

22780
25700

20 MAR 83

24 JAN 91

280767
52156

Thesis

B82243

Brown

c.1

Geostrophic circulation off the coast of Central California.

149298

thesB82243

Geostrophic circulation off the coast of



3 2768 002 08033 5

DUDLEY KNOX LIBRARY